


IBM IBM 3704 and 3705 Data Areas



SY30-3008-0

Programs supported by this handbook:

| Program Name | Program Number | |
|----------------------------|----------------|------|
| Emulation Program | 360H-TX-033 | V1M3 |
| Network Control Program | 360H-TX-034 | V1M2 |
| Network Control Program/VS | 5744BA1 | V2M1 |

First Edition (September 1973)

Changes are periodically made to the information herein; any such changes will be reported in subsequent revisions or Technical Newsletters.

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Preface

This Handbook contains reference information about the contents and format of the major data areas (control blocks, tables, etc.) used in the Network Control Program (NCP) and the Emulation Program (EP). It is designed to be used with the NCP and EP Program Logic Manuals to supplement the program listings and to provide an easy reference to the information in the listings.

This Handbook is directed to the IBM Program Support Representatives and Systems Engineers who provide program maintenance and who need information on the internal organization and logic of the NCP and EP.

This handbook contains three sections:

Section 1: Data Area Relationships contains figures showing the relationships between the various EP and NCP data areas.

Section 2: Data Area Layouts shows the format and content of the EP and NCP data areas.

Section 3: Appendixes contains additional reference material.

Related Publications

IBM 3705 Communications Controller, Network Control Program, Program Logic Manual, Order No. SY30-3003.

IBM 3704 and 3705 Communications Controller Network Control Program/VS, Program Logic Manual, Order No. SY30-3007.

IBM 3705 Communications Controller, Emulation Program, Program Logic Manual, SY30-3001.



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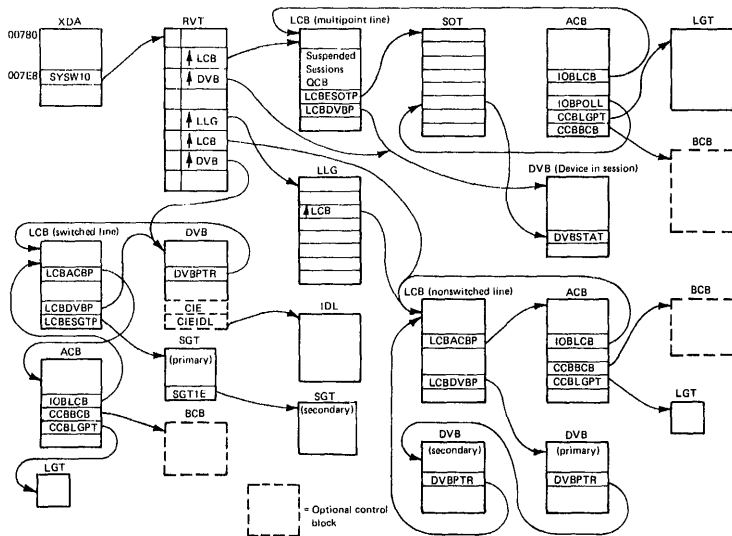


Figure 1. NCP Control Block Relationships

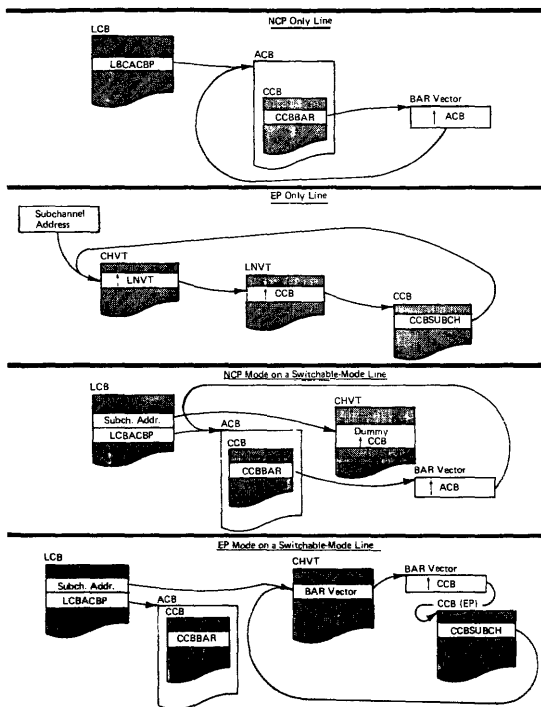


Figure 2. NCP Control Block Relationships for Switched Lines

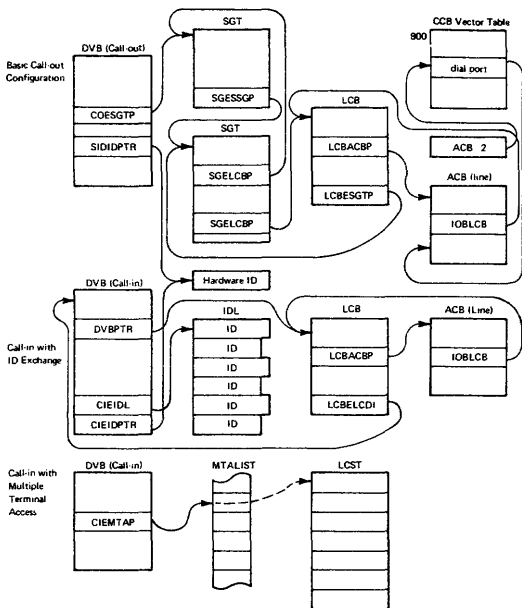


Figure 3. NCP Pointers to the CCB

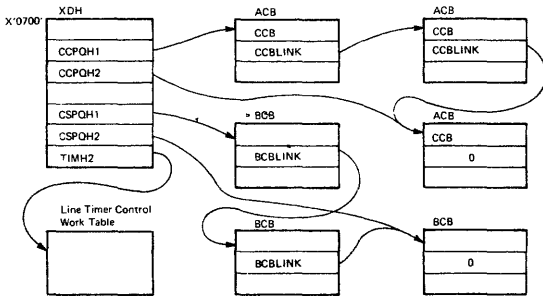


Figure 4. NCP Halfword Direct Addressable Pointers

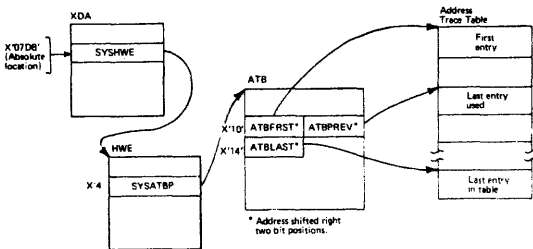


Figure 5. Locating the NCP Address Trace Table

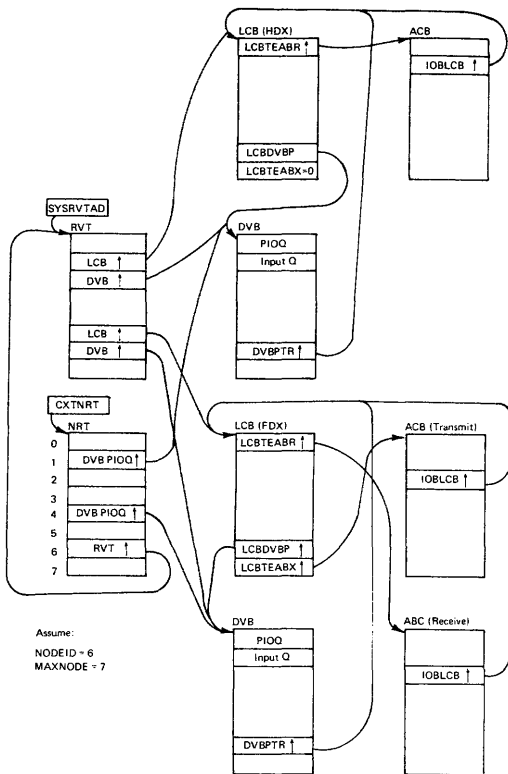


Figure 6. NCP Control Block Relationships for SDLC

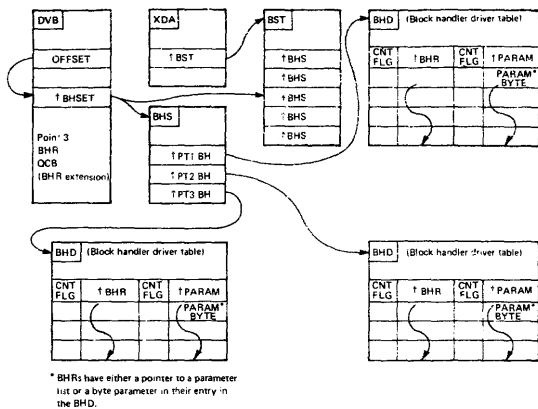


Figure 7. NCP Control Block Relationships for BHRs

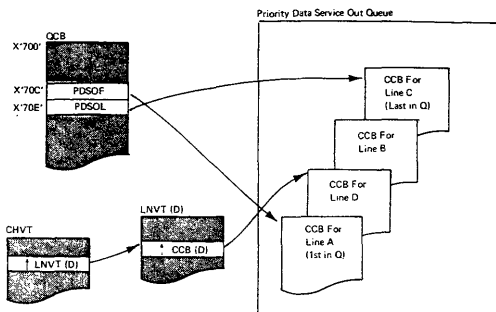


Figure 8. EP Control Block Relationships - Type 2 Scanner

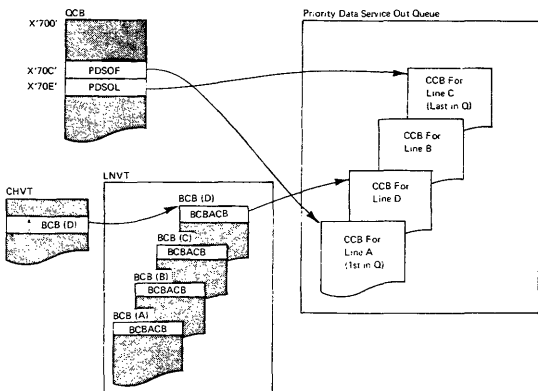


Figure 9. EP Control Block Relationships - Type 1 Scanner



SECTION 2: DATA AREA LAYOUTS

The following conventions are used in this section:

- The displacement of each field from the beginning is given in both decimal and hexadecimal notation (hexadecimal in parentheses). The displacements in the direct addressable areas (XDA, XDB, and XDH) are given in absolute, hexadecimal notation since these are always in a fixed location of storage.
- If a single field has dual uses with different labels according to the use, the displacement is listed only once, and a broken line followed by the word 'or' is inserted between the different labels.
- The contents of some fields are designated as shifted addresses. This means that in 3705 configurations larger than 64K, the storage address is shifted right two bit positions before being placed in the data area.

Shifted addresses are always in field with a defined length of two bytes. If the controller has less than 64K bytes of storage, the address is not shifted.

- Pointers or addresses contained in fields with a defined length of four bytes occupy the last 18 bits of the field. (Only the last 16 bits are significant if controller storage is less than 64K.) Often byte 0 and the first six bits of byte 1 of these fields are used from other purposes, such as for flags. In cases such as these, the four-byte field is shown as follows:

| | | |
|--|--|--|
| 8(8) | | |
| XYZISKEP | | |
| Task entry point (last 18 bits). | | |
| XYZMCBAD Major control block displacement. | 9(9) XYZSCHED Task dispatching priority. | |

- Labels shown in parentheses are equated in NCP and EP code to the defined label for a field. Equated labels are most frequently used in the direct addressable areas.
- One field in every queue control block (QCB) is labeled "major control block displacement". This field contains the offset to the beginning of this QCB from the beginning of the control block that contains the QCB. For example, the DVIMCBD field contains the displacement from the beginning of the device base control block (DVB) to the beginning of the device input QCB.
- Bit patterns or hex values within a field are defined in a byte expansion table following the formatted data area. The bytes within a field are numbered from zero origin. For example, if the first byte in a two-byte field has a unique definition, it is referred to as Byte 0.

ADAPTER CONTROL BLOCK

ACB

Size in bytes: 96 (60)

Created by: NCP generation.

Pointer to ACB: LCBACBP field of LCB.

Function: Contains line control information and the status of I/O operations.

| | |
|--------|---|
| | -2(-2) Address of dial-out line for auto call. |
| 0(0) | Input/Output Block (IOB) |
| 36(24) | Character Control Block (CCB) |

ADDRESS TRACE BLOCK**ATB****Size in bytes:** 32 (20)**Created by:** NCP generation.**Pointer to ATB:** SYSATBP field in HWE.**Function:** Governs the operation of the address trace function executing in level 1.

| | | | |
|---|-----------------------------|---|----------|
| 0(0) | | | |
| ATBPRMS Addresses of trace variables (16 bytes). Parameter 1. | | | |
| 4(4) | | | |
| Parameter 2. | | | |
| 8(8) | | | |
| Parameter 3. | | | |
| 12(C) | | | |
| Parameter 4. | | | |
| 16(10) | | 18(12) | |
| ATBFRST Address of first entry in trace table (CXTATPF). (Shifted address.) | | ATBPREV Address of last entry used in trace table (CXTATPL). (Shifted address.) | |
| 20(14) | | 22(16) | |
| ATBLAST Address of last entry in trace table. (Shifted address.) | | ATBCNTR Number of interrupts processed. | |
| 24(18) | 25(19) | 26(1A) | 27(1B) |
| ATBPRCT | ATBCTL | ATBLVLS | Reserved |
| No. of variables in each trace entry. | Address trace control byte. | Program levels to be traced. | |
| 28(1C) | | 30(1E) | |
| ATBIN Prototype input instruction. | | ATBBR Prototype branch instruction. | |

Size in bytes: 16(10)

Created By: NCP and EP generation.

Pointer: First BCB is at storage location X'800'.

Function: Contains control information for the type 1 scanner. One BCB is created for each line connected to a type 1 scanner.

| | | | |
|---|----------------------------------|---|---|
| 0(0) BCBACB ACB address. | | 2(2) BCBLINK Pointer to next BCB. | |
| 4(4) BCBL2 Bit service routine address. | | 6(6) BCBSCF Sec. control field. | 7(7) BCBPDF Parallel data fld. |
| 8(8) BCBVCT High byte of PCF vector table addr. | 9(9) BCBLCPCF* LCD and PCF | 10(A) BCBSDF Serial data field (10 bits, left justified). | |
| 12(C) BCBMASK* Transmit/receive mask | | 14(E) BCBSYNC (BSC) Sync character. ----- BCBBMASK* (SS) Transmit break mask. ----- BCBFLAG (SDLC) SDLC flag byte. (NCP/VS) | 15(F) BCBSHIFT Start-stop shift count. ----- SDLC one's counter (first 3 bits used as counter). (NCP/VS) |

*Indicates a byte expansion follows.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|------------|--|
| 9(9) | 000. 100. 101. 110. 111. | BCBLCPCF | LCD and PCF. LCD field (bits 0-2). SDLC. (NCP/VS) Start-stop. BSC. Dial. Feedback check. See ICW for PCF expansion (bits 3-7). |

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|------------|--|
| 12(C) | X'0100' X'0100' X'0100' X'00C0' X'0060' X'0080' X'0180' X'0100' X'0300' | BCBMASK | Transmit/receive mask. SDLC. (NCP/VS) BSC EBCDIC. BSC USASCII. Start-stop 9/6. Start-stop 8/5. Start-stop 9/7. Start-stop 10/7. Start-stop 10/8. Start-stop 11/8. |
| 14(E) | X'10' X'20' X'20' X'40' X'40' X'80' | BCBBMASK | Transmit break mask. (SS) Start-stop 8/5. Start-stop 9/6. Start-stop 9/7. Start-stop 10/7. Start-stop 10/8. Start-stop 11/8. |

BLOCK CONTROL UNIT**BCU****Size in bytes:** 20(14) control bytes plus BTU**Located in:** Dynamic buffers.**Created by:** Built by channel IOCS when a block is received from the host. Can be built dynamically by internal routines.**Function:** To request work.**Buffer Prefix**

| | | | | | |
|------|---|------|--|------|---|
| 0(0) | BCBUFCHN Buffer prefix chain field. (Shifted address.) | 2(2) | BCOFFSET Buffer prefix data offset field. | 3(3) | BCDATCNT Buffer prefix data count field. |
|------|---|------|--|------|---|

Event Control Block

| | | | | | |
|------|---|---|----------------------------------|---|-------------------------------|
| 4(4) | BCUSTAT* Block status flags. | 5(5) | BCUESTAT* Event status flags. | 6(6) | BCUECHN ECB chain pointer. |
| 8(8) | BCUECHN (BCUBKLN) Set time interval, as specified by SETIME macro. | | 10(A) | | |
| or | | BCUTCNT BCU text count. | | BCUWQCB Address of waiting task's input QCB. | |
| or | | BCUTFUNC* Trunk function codes. (NCP/VS) | | | |

Work Area

| | | |
|------------------------------|---|--|
| 12(C) | BCURVTE Address of RVT entry (last 18 bits). | |
| BCURED Record descriptor. | BCUFLAGS* Critical text flags to channel output. | |

| | | |
|--|--|---|
| 16(10) BCUTDSP Get byte/put byte displacement value. | 18(12) BCUSSP Subtask sequence pointer for suspended sessions. ----- or BCUBFLG* Block flags - level 2 and level 3. (NCP/VS) | 19(13) BCUBECNT Retry count for ERP. (NCP/VS) |
| 20(14) See "Basic Transmission Unit (BTU)" for format. (Variable in length) | | |

*Indicates a byte expansion follows.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|------------|--|
| 4(4) | 1...1.. .. | BCUCSTAT | Block status flags. Block enqueued. Buffers in block are counted. (Bits 2-7 reserved). |
| 5(5) | 1...1.. .. | BCUESTAT | Event status flags. Event is satisfied. Task is to be dispatched. (Bits 2-7 reserved). |
| 10(A) | Byte 0 1...1..1. Byte 1 1...1..1. 1... | BCUTFUNC | Trunk function codes. (NCP/VS) Forward block to host. Release block - critical text. Exception condition (see BCUCSTAT). Remote has responded - IPL required. Remote has not answered poll. First ERP failed. Returned block because IPL required. Returned block because of error block. |

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|----------------------------------|------------|---|
| 13(D) | 1... .. .1...1. | BCUFLAGS | Critical test flags to channel output. Clear data in release blocks. Replace-session-initiation-information restart mode. Check mode for replace-session-initiation-information. (Bits 3-5 reserved.) |
| 18(12) | 1... .. | BCUBFLG | Block flags - level 2 and level 3. (NCP/VS) Retransmission. |

Size in bytes: 4(4)

Located in: The beginning of each buffer.

Created by: Any routine that uses the LEASE macro to get a buffer.

Pointer to BH: Variable.

Function: Chains buffers in a BCU and points to the beginning of the text data within a single buffer.

| | | |
|---|---|---|
| 0(0) BHBUFCN* Pointer to next buffer in this chain. (Shifted address). | 2(2) BHOFFSET* Offset to beginning of text in this buffer. | 3(3) BHDATCNT* Text data count (for this buffer only). |
|---|---|---|

*See the block control unit (BCU) for labels used in the first buffer of a BCU.

Size in bytes: 8(8) per entry; total size of table is variable.

Created by: NCP generation.

Pointer to BHD: BHS

Function: Defines the block handling routines that are to be executed for a particular block handler.

Entry Format

| | | |
|-------------------|---|----------------|
| 0(0) | BHDRTNP Pointer to block handling routine (last 18 bits). | |
| BHDC1* | | |
| Entry ctl byte 1. | | |
| 4(4) | BHDPARMP Pointer to parameter list (last 18 bits). | |
| BHDC2* | | 7(7) BHDPARMB* |
| Entry ctl byte 2 | | Byte parameter |

*Indicates a byte expansion follows.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|--|------------|--|
| 0(0) | 1... .. .1...1...1...1... | BHDC1 | Entry control byte 1. End of table (last entry). User BHR. (Reserved). Receive control if command is in error. (Undefined). |
| 4(4) | 1... .. .1...1...1...1...1..1..1.. | BHDC2 | Entry control byte 2. Receive control for Read. Receive control for Invite. Receive control for Write. (Reserved). Receive control for Disconnect. Receive control in terminator - subtask for Read I/O. (Reserved). (Reserved). |

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|---------------|---|
| 7(7) | 1...1..1.1 1...1..1.1 | BHDPARMB | Byte parameter (for date/time). Date desired. Calendar form of date desired. Julian format of date desired. Gregorian format 1 of date desired. Gregorian format 2 of date desired. Time desired. Date/time stamp first block of message. (Reserved). |

Size in bytes: 24(18)

Located in: DVB

Created by: NCP generation.

Pointer to BHR: DVBBHRO field in DVB.

Function: Associates block handler routines with a device.

| | |
|---|--|
| 0(0)** | |
| BHRBHST Pointer to BST (last 18 bits). | |
| BHRCTL* BHR control flags. | |

Point 3 QCB (BHRBH3Q) (See QCB for Input Queues for all bit definitions.)

| | | | |
|--|---------------------------------------|--|--|
| 4(4)** LH31ECB Pointer to first BCU queued. (Shifted address.) | | 6(6)** BH3LECB Pointer to last BCU queued. (Shifted address.) | |
| 8(8)** BH3STAT Task and queue status. | 9(9)** BH3PRKEY Protection key. | 10(A)** BH3LINK Pointer to next QCB in chain. (Shifted address.) | |
| 12(C)** BH3TSKEP Task entry point (last 18 bits). | | | |
| BH3MCBD Major control block displace- ment. | | 13(D) BH3SCHED Task dispatching priority. | |
| 16(10)** BH3SAVE Address of save area pushdown list. (Shifted address.) | | 18(12)** BH3LUNK Pointer to previous QCB on the queue. (Shifted address.) | |
| 20(14)** BH3BHSET BH set (or BHR) address (last 18 bits). | | | |
| BH3BHRST BHR status bits. | | 21(15) BH3BHSCB BHR scheduling bits. | |

* Indicates a byte expansion follows.

**Actual position depends upon other extensions to DVB.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|------------|--|
| 0(0) | 1... .. .1..1.1 1... | BHRCTL | BHR control flags. Execute BHR. Point 1. Point 2. Point 3. Point 3 BHRQCB exists for device. (Bits 5-7 reserved). |

Size in bytes: 12(C)

Created by: NCP generation.

Pointer to BHS: BSTBHSPT field in BST.

Function: Points to the block handlers that are to be executed for the block handler set.

| | |
|------|---|
| 0(0) | <div>BHSP1 Pointer to point 1 block handler driver (BHD).</div> |
| 4(4) | <div>BHSP2 Pointer to point 2 BHD.</div> |
| 8(8) | <div>BHSP3 Pointer to point 3 BHD.</div> |

Size: 4 bytes per entry; table can contain up to 255 entries.

Created by: NCP generation.

Pointer to BST: BHRBHST field in BHR extension of DVB.

Function: Points to block handler sets (one entry per BHS).

| | |
|--|--|
| 0(0) | BSTBHSPT Address of BHS (last 18 bits). (For the first entry, bytes 1-3 contain zeros.) |
| BSTCTL* BHR control flags. (For the first entry, this byte contains the count of BH set pointers in the table.) | |

*Indicates a byte expansion follows.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|--|------------|---|
| 0(0) | 1... .. .1...1...1... .. | BSTCTL | BHR control flags. Execute. Point 1. Point 2. Point 3. (Bits 4-7 undefined). |

Size in bytes: 14(E) control bytes + variable length text.

Located in: BCU

Created by: The host access method or an internal NCP routine.

Pointer to BTU: None. The starting byte is at displacement 20(14) into the BCU.

Function: Contains information for either a request for I/O or for a control operation; or a response for the same.

| | | | |
|---|--|---|--|
| 20(14)** BCUSID (BCHSID) Source name. | | 22(16) BCUDID (BCHDID) Destination name (resource ID). | |
| 24(18) BCUSEQ (BCHSEQ) Request tag or sequence number identifying this BTU. | | 26(1A) BCUSRES (BCHSRES) System re- sponse. See Appendix B for responses. | 27(1B) BCULRES* (BCHLRES) Extended response. Contains status of I/O operation. See Appendix B. |
| 28(1C) BCUCMD* (BCHCMD) Command | 29(1D) BCUMOD (BCHMOD) Command modi- fiers. See Ap- pendix A for a list of the BTU commands and their modifiers. | 30(1E) BCUSFLAG* (BCHSFLAG) Function flags. | 31(1F) BCHBDF* BDU flags. |
| 32(20) BCUTLEN (BCHTLEN) Text length. | | 34(22) Text field. (Variable length.) | |

* Indicates a byte expansion follows.

**Displacements represent the offset into the BCU.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|------------------------|--|
| 28(1C) | X'00' X'01' X'02' X'03' X'04' X'05' X'06' X'07' X'08' X'77' Any other | BCUCMD (BCHCMD) | Command. Null. Read (R). Write (W). Online test (T). Restart (Y). Invite (I). Contact (C). (Modifier byte must be zero.) Disconnect (D). Control (Z). Unsolicited response. Invalid. |
| 30(1E) | 1... .. .1...1.1 1...1..1.1 | BCUSFLAG (BCHSFLAG) | Function flags. Checkpoint select (control commands) or start of header. Header prefix. Suppress Invite (control com- mands) or leading graphics. First block of message. Transparent data. Positive acknowledgement. Negative acknowledgement. Alternate acknowledgement. |
| 31(1F) |1..1. | BCHBDUF | BDU flags. Suppress write response. Selective text return. (NCP/VS) |

Size in bytes: 4(4)

Located in: DVB

Created by: NCP generation.

Pointer to BUE: DVBBUO field in DVB.

Function: Contains control information for devices that can be contacted over a separate line when the current line fails.

| | |
|---------------------------------|--|
| 0(0) BUEFLAGS* Flag byte. | 1(1) BUEPLCBP Primary LCB pointer. |
|---------------------------------|--|

* Indicates a byte expansion follows.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|---------------|---|
| 0(0) |1..1..1 | BUEFLAGS | Flag byte Service seeking skip when the device is on a multipoint line. Error occurred in dialing out. Invite pending remembrance. Back up in progress. (Bits 1-4 reserved). |

CHARACTER CONTROL BLOCK FOR EP**CCB
(EP)**

Size in bytes: 36 for each start-stop line (with auto call extension).
 34 for each start-stop line (without auto call extension).
 44 for each BSC line.

Created by: Emulation Program generation.

Updated by: LCP and ICP

Pointer to CCB: LNV T

Referenced by: LCP, ICP, LNV T, CHVT

Function: Contains current information on the physical operation of a line. One CCB is generated for each line specified.

| | | | |
|--|---|--|--|
| 0(0) CCBDATA Data Buffer 0. | | | |
| 4(4) CCBDATA1 Data Buffer 1. | | | |
| 8(8) CCBSVLNK Data service queue forward chain pointer. | | 10(A) CCBSOLNK Status out queue forward chain pointer. | |
| 12(C) CCBSUBCH Multiplexer sub-channel address. | 13(D) CCBBTLCD Type 1 LCD for set PCF line use. | 14(E) CCBCSTAT* Final line status byte. | 15(F) CCBCSENSE* Final line sense byte. |
| 16(10) CCBCMD Current command for CCB. (See Appendix C.) | 17(11) CCBLRI* Line request information. | 18(12)*** CCBCSTAT Current status. | 19(13)*** CCBCSENS Current sense. |
| 20(14) CCBCAC* Character address counter. | 21(15) CCBSVSTC* Service/status flag byte. | 22(16) CCBCLOCK Timer count field. | 23(17) CCBTMADR Time-out routine displacement into branch table. |
| 24(18) CCBL2 Address pointer for next level 2 interrupt. | | 26(1A) CCBOPT* CCB option byte 1. | 27(1B) CCBOPT2* CCB option byte 2. |
| 28(1C) CCBSTMOD* Set mode byte-- Output X'46' | 29(1D) CCBLCD* Line control definition (LCD) field. (High 4 bits contain line control definer, low 4 bits contain 0.) | | |

* Indicates that a byte expansion follows.

*** For byte expansion of CCBCSTAT, refer to CCBSTAT.

For byte expansion of CCBCSENS, refer to CCBCSENSE.

Start/Stop Extension

| | | |
|---|--|--|
| | 30(1E) CCBLRC SS longitudinal redundancy check byte. | 31(1F) CCBSSC* SS control flags byte. |
| 32(20) CCBLGT Line group table address. | | |

Auto Call Feature Extension

| |
|--|
| 34(22) CCBACADR Auto call adapter interface address. |
|--|

BSC Extension

| | | |
|---|---|--|
| 30(1E) CCBBCC BSC block check characters. | 32(20) CCBSYN BSC EBCDIC or USASCII SYN char. | 33(21) CCBEOT BSC EBCDIC or USASCII SYN char. |
| 34(22) CCBACADR Auto call adapter interface address. | 36(24) CCBL2A1 Level 2 link address. | |
| 38(26) CCBFLGB1* CCB flag byte 1- status. | 39(27) CCBFLGB2* CCB flag byte 2- terminal type. | 40(28) CCBDLCOM Dual communications feature line in- terface address (2701 only). |
| 42(2A) CCBSADR Station select ** feature poll and selection ad- dress. | 43(2B) CCBGADR Station select ** | |

* Indicates that a byte expansion follows.

** 3704/3705 is tributary station.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|------------|--|
| 13(D) | 100. 101. 110. 111.0 000. ...1 111. 1 | CCBBTLCD | Type 1 LCD for set PCF line use. SS LCD. BSC LCD. DIAL LCD. Line disable LCD. PCF state X'0' (NOP). PCF state X'F' (DISABLE). PCF state change made. |
| 14(E) | X'00' X'01' X'02' X'04' X'08' X'0C' X'0D' X'0E' X'10' X'20' X'40' X'4C' X'80' | CCBSTAT | Final line status byte. Reset status byte Set UE. Set UC. Set DE. Set CE. Set CE, DE. Set CE, DE, UE. Set CE, DE, UC. Set CU busy. Set control unit end. Set SM. Set CE, DE, SM. Set attention. |
| 15(F) | X'00' X'02' X'04' X'08' X'10' X'20' X'40' X'80' | CCBSENSE | Final line sense byte. Reset sense byte. Set lost data. Set overrun. Set data check. Set equipment check. Set bus out parity check. Set intervention required. Set command reject. |
| 17(11) | 1... 1... | CCBLRI | Line request information. Set interface disconnect flag. Set data end flag. |
| 20(14) | X'07' 1... | CCBCAC | Character address counter. Reset CAC. Set BSC inhibit store flag. |
| 21(15) | X'88' X'48' X'C0' | CCBSVSTC | Service/status flag byte. Set data service (buffer 0) + data end. Set data service (buffer 1) + data end. Set SV0 and SV1 bits. |

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|--|---------------|--|
| 26(1A) | 1... .. .1...1...1...1...1...1...11 | CCBOPT | CCB option byte Auto call option installed. Long disable time-out. Dualcom interface-- A=0, B=1 (BSC). Not unit exception on EOT (IBM SS). Ring option installed. Switched line installed. Duplex line installed-- 0=half, 1=full. Type 2 scanner highest interrupt priority. |
| 27(1B) | 1... .. .1...1...1...1...1...1...1 | CCBOPT2 | CCB option byte 2. Channel decode IBM type 1 and type 2 EOB. Trace active for this line. Channel decode IBM type 3 ETX. 2702 or 2703. SS no DCD security monitor. World Trade telegraph. Not long line quiet time-out (25.6 seconds). IBM modem flag (option 1, SS only). |
| 28(1C) | 1... .. .1...1...1...1...1...11 | CCBSTMOD | Set mode byte, Output X'46' Type 1 scanner low bit. Service priority. Diagnostic wrap mode. Binary sync clock. External (data set) clocking. Data rate select. Oscillator select. |
| 29(1D) | 0000 0010 0011 0100 0101 0110 0111 1100 1101 1111 | CCBLCD | Line control definition (LCD) field. SS 9/6 (1 start, 6 data, and 2 stop bits). SS 8/5 (TTY1 - 83B3, 115A). Autocall LCD. SS 9/7 (IBM Type 1). SS 10/7. SS 10/8 (2848). SS 11/8 (TTY2 - TWX models 33/35). BSC EBCDIC BSC USASCII Feedback check. |

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|---------------|---|
| 31(1F) | 000. 001. 010. 100. 110.1 1...1..1.1 | CCBSSC | Start-stop control flags byte. TTY2 type line. 2848 type line. TTY1 type line. IBM type 1 line. IBM type 2 line. Bypass LRC (IBM type 1 and 2); not upshift (TTY 1 and 2). Not immediate end (no line quiet pad check). Lower case remember. Not text in (IBM type 1 and type 2); not FIGS H (TTY2). Not text out (IBM) type 1 and type 2); not first character (2848 and TTY). |
| 38(26) | 1...1...1 1...1..1. | CCBFLGB1 | CCB flag byte 1--status. Channel priority. EIB mode. Interrupt mode. EIB data check. EIB overrun. Code B selected. |
| 39(27) | 1...1... 1... 1...1. | CCBFLGB2 | CCB flag byte 2--terminal type. Dualcom installed. Station select installed. Transparent mode, wait for second Write. Second Write accepted. Multipoint address remember flag. |

CHARACTER CONTROL BLOCK FOR NCP

CCB
(NCP)

Size in bytes: 62(3E) for SS and BSC; 70(46) for SDLC.

Created by: NCP generation.

Pointer to CCB: Follows Input/Output Block (IOB) in Adapter Control Block (ACB).

Function: Contains line control information.

| | | | |
|---|---|-------------------------------|-----------------------------------|
| 36(24) CCBL2 Address of current level 2 character service routine. | 38(26) CCBSTATE* Pointer to character service state address table. Initially, CCBSTATE contains the address of the beginning of the state address table. The masks shown in the byte expansion are applied to the low-order byte of CCBSTATE by the character service routines. They change the value of CCBSTATE so that it points to the entry in the state address table that contains the address of the routine to handle the line state indicated. | | |
| 40(28) CCBTACB or CTBACB Pointer to the next ACB in the timer chain. | 42(2A) CCBTWORK or CTBWORK Timer work entry for this ACB. | | |
| 41(2C) CCBLINK Pointer to next ACB in level 2-3 chain. | 46(2E) CCBTIME* Time-out interface. <table> <tr> <td>CCBTOCMD Time-out command.</td> <td>CCBTOREM Time-out remembrance.</td> </tr> </table> | CCBTOCMD Time-out command. | CCBTOREM Time-out remembrance. |
| CCBTOCMD Time-out command. | CCBTOREM Time-out remembrance. | | |
| 48(30) CCBBAR Line address, if type 2 scanner. or CCBBCB BCB address, if type 1 scanner. | 50(32) CCBBCC CRC check character (BSC). or CCBLRC LRC character (start-stop). | | |

* Indicates a byte expansion follows.

| | | |
|--|---|---|
| 52(34) CCBLGPT Pointer to line group table for this group. | 54(36) CCBCNTS Character count/buffer count field. | |
| | CCBCHAR Buffer character count. | CCBCUT Buffer maximum for a receive operation. |
| 56(38) CCBSTAT1* Current operational status of the line. | 58(3A) CCBEND1 Line status at completion of a level 2 operation. The level 2 routine moves the status from CCBSTAT1 to CCBEND1 at the end of a operation. | |
| 60(3C) CCBDATA Address of the data byte being sent or received (last 18 bits). | | |
| CCBEND2 Record descriptor flags, moved from CCBSTAT2 at end of a level 2 operation. | CCBNCFL* Flags for control operations between IOB commands. | |
| 64(40) CCBSTART Current buffer address (last 18 bits). | | |
| CCBOFSET At start of a receive operation, set to the offset into the buffer of the first data character; after first character is received, set to zero, indicating that data was stored. | CCBFLAGS* General flags. | |
| 68(44) CCBRXLAT Address of receive translate decode table. | 70(46) CCBTXLAT High-order byte of transmit translate decode table address. | 71(47) CCBSTAT2 Record descriptor flags. If any bit in this field is on, it indicates that the corresponding character was scanned. or CCBNEXT Buffer for next character to be transmitted. |

* Indicates a byte expansion follows.

| | | | |
|---|---|---|--|
| 72(48) <div style="text-align: center;">CCBHDBUF</div> <div style="text-align: center;">Address of first buffer in a block (last 18 bits).</div> | | | |
| CCBUFCT Buffer maximum for a receive op- eration. | CCBTYPED* Dial control flags. | | |
| 76(4C) <div style="text-align: center;">CCBL3</div> Address of next level 3 routine to be executed. | 78(4E) CGBERTRY Text error retry limit. | 79(4F) CCBERCNT Retry counter for text and control re- tries. | |
| 80(50) CCBSMSDF* Set mode con- trol flags. | 81(51) CCBXTPCF Transmit turn around PCF/LCD. | 82(52) <div style="text-align: center;">CCBCTL*</div> Control flags/line type. | |
| | | CCBRSPON Control flags. | CCBTYPED* Line type. |
| 84(54) <div style="text-align: center;">CCBESTAT</div> Expected ending status of the level 2 operation. | 86(56) CCBICCCT Initial control character count. | 87(57) CCBVTABD Vertical tab delay (number of idles sent after a vertical tab; start-stop only). | |
| 88(58) CCBCRTN Number of print positions car- riage will return in time it takes to send one idle character (SS only). | 89(59) CCBLCNT Length of print line (SS only). | 90(5A) CCBLTCRP Number of data positions since last carriage re- turn. (NCP/VS) | 91(5B) CCBNTCRP Net carriage return value. (NCP/VS) |

The following fields are required for SDLC lines.

| | | | |
|--|---|---|---|
| 92(5C) CCBAFLD Secondary sta- tion address. | 93(5D) CCBCFLD SDLC C field. | 94(5E) CCBI1FLD First data char- acter or BC1 re- ceived. | 95(5F) CCBI2FLD Second data char- acter or BC2 received. |
| 96(90) CCBAEXP Secondary sta- tion address ex- pected. | 97(61) CCBNBUFC Field used to pass C field to level 3 if there is no buffer. | 98(62) <div style="text-align: center;">CCBDLCF</div> SDLC flag field. | |

* Indicates a byte expansion follows.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---------------------------|------------|---|
| 38(26) | | CCBSTATE | Pointer to character service state address table. |
| | | | State masks used by BSC character service |
| | X'00' | | Receive not test. |
| | X'02' | | Receive phase. |
| | X'04' | | Receive BCC. |
| | X'06' | | Receive first not text. |
| | X'08' | | Receive end pad. |
| | X'0A' | | Queue received subblock. |
| | X'0C' | | Receive text. |
| | X'0E' | | Receive intermediate BCC. |
| | X'10' | | Transmit not text. |
| | X'14' | | Transmit BCC. |
| | X'16' | | Transmit syn insertion. |
| | X'18' | | Transmit end pad. |
| | X'1A' | | Transmit initial. |
| | X'1C' | | Transmit text. |
| | X'1E' | | Transmit intermediate BCC. |
| | X'20' | | Receive idle. |
| | X'22' | | Receive enable. |
| | X'24' | | Receive DLE in text. |
| | X'26' | | Receive disconnect. |
| | X'28' | | Receive DLE in not text. |
| | X'28' | | Transmit DLE in not text. |
| | X'2A' | | Receive transparent text. |
| | X'2C' | | Receive first transparent text. |
| | X'2E' | | Receive DLE in transparent text. |
| | X'30' | | Transmit Diagnostic. |
| | X'32' | | Transmit Dial. |
| | X'34' | | Transmit DLE in text. |
| | X'36' | | Transmit syn insert-transparent. |
| | X'3A' | | Transmit transparent text. |
| | X'3C' | | Transmit first transparent text. |
| | X'3E' | | Transmit DLE in transparent text. |
| | | | State masks used by start-stop character service |
| | X'00' | | Receive control. |
| | X'02' | | Receive lost data. |
| | X'04' | | Receive LRC. |
| | X'06' | | Receive response. |
| | X'0E' | | Line turnaround. |
| | X'10' | | Transmit ctl. w/repetition. |
| | X'12' | | Transmit pad. |
| | X'14' | | Transmit LRC. |
| | X'16' | | Transmit reply. |
| | X'1A' | | Transmit ctl. w/address. |

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--|---------------------------|---------------|---|
| | X'1E' | | Line turnaround. |
| | X'24' | | Receive first character, MTA. |
| | X'28' | | Receive post sense byte. |
| | X'2A' | | Post the ACB queue. |
| | X'2C' | | Receive line quiet test(1). |
| | X'2E' | | Receive line quiet test(2). |
| | X'32' | | Receive line quiet test(3). |
| | X'34' | | Transmit carriage idles. |
| | X'36' | | Transmit 1030 text idles. |
| | X'38' | | Transmit reset pad flag. |
| | X'3C' | | Transmit subblock end. |
| | X'3E' | | Transmit break. |
| State masks used by SDLC character service | | | |
| | X'0E | | Shoulder tap. |
| | X'1E' | | Shoulder tap. |
| | X'20' | | Idle. |
| | X'22' | | Enable. |
| | X'26' | | Disconnect. |
| | X'30' | | Diagnostic. |
| | X'32' | | Dial. |
| | X'2E' | | Shoulder tap. |
| | X'3E' | | Shoulder tap. |
| State bits and definitions | | | |
| | X'20' | | DLE mask. 1=DLE encounteree. 0=No DLE encountered. |
| | X'10' | | Transmit/Receive mask. 1=Transmit. 0=Receive. |
| | X'04' | | CTL or text out test mask 1=SS state is receive reply. 0=SS state is receive control. |
| | X'02' | | Send EOA mask. 1=Send pad in place of EOA. 0=Send EOA. |
| | X'01' | | First flag mask. 1=First non SYN or DLE. 0=No first non SYN or DLE. |

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|---------------|---|
| 60(3C) | Byte 1 1... .. .1...1...1... .. | CCBNCFL | Flags for control operations between IOB commands. Command initialization delay required. Special ender procedure when no command is up. Send TTD bit. Send WACK. (Bits 4-7 reserved). |
| 64(40) | 1... .. .1...1...1... 1... | CCBFLAGS | General flags. Tab preceded CR/LF (SS). No time-out (BSC). Control mode indication. 1 = control mode is response to text. 0 = control mode if from polling or addressing. 1 = post ACB to the queue after turnaround. One character of break signal received (SS). Next event is ITB (BSC). Line is in diagnostic mode. (Bits 5-7 reserved). |
| 72(48) | Byte 1 1... .. .1...1...1... .. | CCBTPEC | Dial control flags. Switched line. Line has auto dial unit (switched only). Recognize ring indicator lead. Line has DC telegraph loop. (Bits 4-7 reserved). |

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|--|---|
| 80(50) | 1... .. .1...1...1... 1... 1.. 1.1 | CCBSMSDF | Set mode control flags. Service priority (type 1 scanner). 1 = low priority. 0 = high priority. Diagnostic mode. Data terminal ready bit. 1 = Synchronous line. 0 = start-stop line. 1 = modem clocking. 0 = 3705 clocking. Data rate select bit (World Trade modems). 1 = high speed. 0 = low speed. Oscillator select bit 1. Oscillator select bit 2. |
| 82(52) | Byte 0 1... .. .1...1...1... 1... Control Flag Definitions for Polling Operations 1... .. .1...1...1... .. | CCBCTL CCBRSPON Control Flag Definitions for Replies | Control flags/Line type. Control flags. Send NAK reply/delay after autodial. Send ACK reply. Alternating ACK bit for BSC (valid only if bit 1 is also on). 1 = send ACK1. 0 = send ACK0. Last text reply was WACK (BSC). TTD received when ACK outstanding. Expected receive alternate ACK bit (BSC). 1 = ACK1 expected reply. 0 = ACK0 expected reply. (Bits 5-7 reserved). Service seeking polling, or single poll. (Reserved). Service seeking skip bit. 1 = terminate if at end of service order table. 0 = Continue service seeking. Service seeking. (Bits 4-7 reserved). |

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---------------------------|---------------|--|
| | | | Control Flag Definitions for Enable/Dial Operations |
| | 1... .. | | Abort enable dial. |
| | .1... .. | | Abort when level 2 processing ends. |
| | ..1... .. | | (Reserved). |
| | ...1... .. | | Send ENQ after ID. |
| | | | (Bits 4-7 reserved). |
| | | | Control Flag Definitions for Text Operations |
| | 1... .. | | Insert data before text. |
| | | | (Bits 1-7 reserved). |
| | | | Control Flag Definitions for Multiple Terminal Access |
| | 1... .. | | MTA retry in process. |
| | | | (Bits 1-3 reserved). |
| | 1... | | MTA line enabled. |
| |1. | | Phase bits: |
| | | | B'00' = Idle. |
| | | | B'01' = Receive text. |
| | | | B'10' = Receive text reply. |
| | | | B'11' = Receive control. |
| |1. | | Leading graphics being sent. |
| |1 | | Sub-blocking occurred. |
| | Byte 1 | CCBTYP: | Line type. |
| | 1... .. | | Switched lines. |
| | .1... .. | | (Reserved). |
| | ..1... .. | | 1 = SDLC (if bit 4 = 0). |
| | ...1... .. | | 0 = Not SDLC. |
| | 1... | | Use data set |
| | | | new sync feature. |
| | 1... | | Line type bit. |
| | | | 1 = BSC. |
| | | | 0 = start-stop. |
| |1.. | | Remote station can receive error message (BSC). |
| | | | Time-out valid reply for negative poll (start-stop). |
| |1. | | Point-to-point contention bit (BSC). |
| | | | 1 = SDLC secondary station or point-to-point contention secondary station. |
| | | | 0 = point-to-point contention primary station. |
| | | | World Trade shift bit (SS). |
| | | | 1 = upshift on space character (WTTY only). |
| | | | 0 = no upshift on space. |
| |1 | | Strip FIGS/LTRS in received text (WTTY, SS only). |

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|--|---------------|--|
| 98(62) | Byte 0 1... .. 1... .. Byte 1 | CCBDLCF | SDLC flag field. Level 2 to level 3 interlock bit. Quiesce mode. (Bits 2-7 reserved.) Reserved. |

CHARACTER CONTROL BLOCK FOR PEP**CCB
(PEP)**

Size in bytes: 38 for each start-stop line.
44 for each ESC line.

Located: SLVL5

Created by: NCP generation.

Updated by: LCP, ICP.

Pointer to CCB: LNVF

Referenced by: LCP, ICP, CHVT.

Function: Contains current information on the physical operation of a line. Once CCB is generated for each line specified.

| | | | |
|---|--|--|---|
| 0(0) CCBDATA (CCBSJB1) Data Buffer 0. | | | |
| 4(4) CCBCDATA1 Data Buffer 1. | | | |
| 8(8) CCBSVLNK Data service queue forward chain pointer. | | 10(A) CCBSOLNK Status out queue forward chain pointer. | |
| 12(C) CCBSUBCH Multiplexer sub-channel address. | 13(D) CCBBTLCD Type 1 LCD for set PCF line use. | 14(E) CCBSTAT* Final line status byte. | 15(F) CCBSENSE* Final line sense byte. |
| 16(10) CCBCMD Current command for CCB. (See Appendix C.) | 17(11) CCBLRI* Line request information, 5 bits. | 18(12)** CCBCSTAT Current status. | 19(13)** CCBCSENS Current sense |
| 20(14) CCBCAC* Character address counter. | 21(15) CCBSVSTC Service/status flag byte. | 22(16) CCBCLOCK Timer control field. | 23(17) CCBTMADR Timeout routine displacement into branch table. |
| 24(18) CCBACADR Autocall address. | | 26(1A) CCBOPT* CCB option byte 1. | 27(1B) CCBOPT2* Option byte 2. |

* Indicates that a byte expansion follows.

**For byte expansion of CCBCSTAT, refer to CCBSTAT.
For byte expansion of CCBCSENS, refer to CCBSENSE.

| | |
|--|---|
| 28(1C) CCBSTMOD* Set mode byte-- Output X'46' | 29(1D) CCBLCD* Line control definition (LCD) field. (High 4 bits contain line control definer, low 4 bits contain 0.) |
|--|---|

Start/Stop Extension

| | | | |
|---|-----------------------------------|--|--|
| | | 30(1E) CCBLRC SS longitudinal redundancy check byte. | 31(1F) CCBSSC* SS control flags byte. |
| 32(20) Null byte. | 33(21) CCBPEPFL* PEP flags. | 34(22) CCBLGT SS line group table pointer. | |
| 36(24) CCBL2 Level 2 interrupt address. | | | |

Binary Synchronous Extension

| | | |
|--|--|---|
| 30(1E) CCBBCC BSC block check characters | | 32(20) CCBPEPFL* PEP flags. |
| CCBBCC1 BSC block check character 1. | 31(1F) CCBBCC2 BSC block check character 2. | |
| 34(22) CCBSYN BSC EBCDIC or USASCII Syn character. | 35(23) CCBEOT BSC EBCDIC or USASCII EOT character. | 36(24) CCBL2 Address of current level 2 character service routine. |
| 38(26) CCBFLGB1* Flag byte 1-- status. | 39(27) CCBFLGB2* Flag byte 2-- terminal type. | 40(28) CCBL2A1 Lost data routing. |
| 42(2A) CCBDLCOM CCB address if dual communica- tions feature is installed (2701 em- ulation only). | | |

* Indicates a byte expansion follows.

Station Select Feature Extension (Optional)

| | |
|--|---|
| 44(2C) CCBSADR Station selection address and sta- tion poll ad- dress. These two addresses differ in bit posi- tion 2. | 45(2D) CCBGADR* Group selection ad- dress. |
|--|---|

* Indicates that a byte expansion follows.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|------------|---|
| 14(E) | X'00' X'01' X'02' X'04' X'08' X'0C' X'0D' X'0E' X'10' X'20' X'40' X'4C' X'80' | CCBSTAT | Final line status byte. Reset status byte. Set UE. Set UC. Set DE. Set CE. Set CE, DE. Set CE, DE, UE. Set CE, DE, UC. Set CU busy. Set control unit end. Set SM. Set CE, DE, SM. Set attention. |
| 15(F) | X'00' X'02' X'04' X'08' X'10' X'20' X'40' X'80' | CCBSENSE | Final line sense byte. Reset sense byte. Set lost data. Set overrun. Set data check. Set equipment check. Set bus out parity check. Set intervention required. Set command reject. |
| 17(11) | 1... 1... | CCBLRI | Line request information. Set interface disconnect flag. Set data end flag. |
| 20(14) | X'07' ... 1... | CCBCAC | Character address counter. Reset CAC. Set BSC inhibit store flag. |

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|--|---------------|---|
| 21(15) | X'88' X'48' X'C0' | CCBSVSTC | Service/Status flag byte. Set data service (buffer 0) + data end. Set data service (buffer 1) + data end. Set SV1 and SV0 bits. |
| 26(1A) | 1...1..1..1..1 1...1..11 | CCBOPT | CCB option byte 1 Auto call option installed. Long disable time-out. Dualcom interface A=0 B=1(BSC). Not unit exception on EOT(IBM SS). Ring option installed. Switched line installed. Duplex line installed 0=half, 1=full. Type 2 scanner highest interrupt priority. |
| 27(1B) | 1...1..1..1 1...1..1..1 | CCBOPT2 | CCB option byte 2. Channel decode IBM type 1 and type 2 EOB. Trace active for this line. Channel decode IBM type 3 ETX. 2702 or 2703. SS no DCD security monitor. World Trade telegraph. Not long line quiet time-out (25.6 seconds). IBM modem flag (option 1, SS only). |
| 28(1C) | 1...1..1..1 1...1..11 | CCBSTMOD | Set-mode byte, Output X'46'. Type one scanner low bit service priority. Diagnostic Wrap mode. Data terminal ready. Binary sync clock. External (data set) clocking. Data rate select. Oscillator select. |

| | | | |
|-----------------------------------|---|----------|--|
| 29(1D) | 0000 0010 0011 0100 0101 0110 0111 1100 1101 1111 | CCBLCD | Line control definition (LCD). SS 9/6 (1 start, 6 data, and 2 stop bits). SS 8/5 (TTY 1 - 83B3, 115A). Autocall LCD. SS 9/7 (IBM type 1). SS 10/7. SS 10/8 (2848). SS 11/8 (TTY2 - YWX models 33/35). BSC EBCDIC. BSC USASCII. Feedback check. |
| 31(1F) | 000. 001. 010. 100. 110.1 1... 1..1. 1 | CCBSSC | Start-stop control flags byte. TTY2 type line. 2848 type line. TTY1 type line. IBM type 1 line. IBM type 2 line. Bypass LRC (IBM type 1 and 2); not upshift (TTY 1 and 2). Not immediate end (no line quiet pad check). Lower case remember. Not text in (IBM type 1 and 2); not Figs H (TTY2). Not text out (IBM type 1 and 2); not first character (2848 and TTY). |
| 32(20) (BSC) 33(21) (SS) | Byte 0 Byte 1 1... | CCBPEPFL | PEP Flags Reserved. 0=NCP ACB. 1=EP CCB. |
| 38(26) | 1...1...1 1...1..1. | CCBFLGB1 | CCB flag byte 1-status. Channel priority. EIB mode. Interrupt mode. EIB data check. EIB overrun. Code B selected. |
| 39(27) | 1...1... 1... 1..1. | CCBFLGB2 | CCB flag byte 2-terminal type. Dualcom installed. Station select installed. Transparent mode, wait for second write. Second write accepted. Multipoint address remember flag. |
| 45(2D) | ..1. | CCBGADR | Group selection address. Multipoint address difference bit. |

Size in bytes: 16(10)

Located in: DVB

Created by: NCP generation.

Pointer CGP: DVBCLSO field in DVB

Function: Contains information necessary to reinitiate suspended sessions of general polled devices.

| | | |
|--|---|---------------------|
| 0(0)* | | |
| CGPRVTE Pointer to RVT entry. | | |
| 4(4)* CGPSSC Suspended sessions count. | 5(5)* CGPSSS Suspended sessions serviced. | 6(6)* (Reserved) |

Cluster Suspended Sessions QCB
(See QCB for Work Queues for all bit definitions.)

| | | |
|---|---------------------------------------|---|
| 8(8)* | | 10(A)* |
| CGP1ECB Pointer to first BCU queued. (Shifted address.) | | CGPLECB Pointer to last BCU queued. (Shifted address.) |
| 12(C)* CGPSTAT Task and queue status. | 13(D)* CGPPRKEY Protection key. | 14(E)* CGPLINK Pointer to next QCB in chain. (Shifted address.) |

*Actual position depends on other extensions present.

Size in bytes: 128(80)

Created by: NCP Generation

Pointer to CHB: CHSVH2 field in XDH

Function: Contains the parameters and control fields used by the type 2 channel adapter I/O supervisor.

CHB Prefix

| | |
|----------|---|
| -32(-20) | CXCAWQ Channel work QCB. (For format, see Queue Control Block for Work Queues.) |
| -24(-18) | CXCAHQ Channel hold QCB. (For format, see Queue Control Block for Work Queues.) |
| -16(-10) | CXCAECB Event control block for leasing buffers. (For format, see Event Control Block.) |
| -8(-8) | Character ID (XXCXTCHB) for use in locating the CHB in a storage dump (length of 8 bytes). |

| | | | |
|---|---|---------------------|--|
| 0(0) CHBSTATE* Channel adapter outbound state field. | 1(1) CHBTRIG* Channel trigger field. | 2(2) (Reserved). | 3(3) CHBCASEL CA select byte- indicates current primary CA. |
| 4(4) CHBXR50 Save area for external register X'50'. | 6(6) CHBXR51 Save area for external register X'51'. | | |
| 8(8) CHBXR52 Save area for external register X'52'. | 10(A) CHBXR53 Save area for external register X'53'. | | |
| 12(C) CHBXR54 Save area for external register X'54'. | 14(E) CHBXR55 Save area for external register X'55'. | | |

*Indicates a byte expansion follows.

| | | |
|--|---|---|
| 16(10) CHBXR57 Save area for external register X'57'. | 18(12) CHBXR5C Save area for external register X'5C'. | |
| 20(14) CHBIM1SV Save area for input manager's linkage register to CXCACIM1. | 24(18) CHBIM3SV Save area for input manager's linkage register to CXCACIM3. | |
| 28(1C) CHBECBAD Address of ECB for leasing buffers. | 32(20) CHBEQSV Address of the complete BTU to be passed to the system router. | |
| 36(24) CHBEQSVN Address of the last buffer in the BTU to be enqueued. | | |
| 40(28) CHBBSVS Address of the first buffer on the save chain. | | |
| 44(2C) CHBBSVE Address of the last buffer on the save chain. | | |
| 48(30) CHBICFB Address of the first buffer in the CW chain. | | |
| 52(34) CHBICPS Pointer to the input CW chain (CIC). | 54(36) CHBICFE Address of the first CW on the input CW chain (CIC). | |
| 56(38) CHBICLE Address of the last CW on the input CW chain (CIC). | 58(3A) CHBLEXCW Address of last executed CW. | |
| 60(3C) CHBRNBS Number of data bytes in one NCP buffer (shifted left two bits). | 62(3E) CHBLBCNT Data count for last inbound buffer used. | |
| 64(40) CHBRCNT Original data count in last CW executed. | 66(42) CHBRNBAL NCP generated buffer lease count for inbound data. | 67(43) CHBBLC Current buffer lease count (same as CHBRNBAL except during slowdown, when this field equals one). |
| 68(44) CHBCOMSV Save area for linkage register for CXCACOM. | | |
| 72(48) CHBHQBS Address of the last outbound BTU given to the channel adapter output initiator. | | |

| | | | | | |
|---------|--|---|---|--|--|
| 76(4C) | | | CHBWQAD Address of the channel work QCB. | | |
| 80(50) | | | CHBHQAD Address of the channel hold QCB. | | |
| 84(54) | | | CHBOCFB Address of the first buffer on the output CW chain (COC). | | |
| 88(58) | | CHBOCPS Pointer to the output CW chain (COC). | | 90(5A) CHBOCFE Address of the first CW on the output CW chain (COC). | |
| 92(5C) | | CHBOCLE Address of the last CW on the output CW chain (COC). | | 94(5E) CHBWKA Save area. | |
| 96(60) | | CHBHBS Host buffer size in bytes. | | 98(62) CHHBAL Number of host buffers allocated per read list. | 99(63) CHBOCR Number of host buffers remaining for use by the output CW chain (COC). |
| 100(64) | | CHBP1PT Pointer to start of access method pad 0. | | 102(66) CHBPAD1 Number of bytes in access method pad 0. | 103(67) (Reserved). |
| 104(68) | | CHBP2PT Pointer to start of access method pad 1. | | 106(6A) CHBPAD2 Number of bytes in access method pad 1. | 107(6B) (Reserved) |
| 108(6C) | | CHBDLAY NCP generated value for attention delay in tenths of a second. | | 110(6E) CHBATTO First attention time-out interval. | |
| 112(70) | | CHBATT2 Second attention time-out interval. | | 114(72) CHBSSICF CA-inoperative flag for level 1 only. | 115(73) (Reserved). |
| 116(74) | | | (Reserved). | | |
| 120(78) | | | CHBERPSV Save area for channel error recovery procedure. | | |
| 124(7C) | | | CHBSCBA Address of secondary channel adapter extension, if present. Zero if not present. | | |

Control Word Chain Area**

| | |
|------|--|
| 0(0) | CHBCOCWS Variable length area for Out CW chain (COC). |
| *** | CHBCICWS Variable length area for In CW chain (CIC). |

**If the secondary channel adapter extension to the CHB is present, this area (Control Word Chain Area) follows the extension.

***Offset depends on length of CHBCOCWS.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|------------|--|
| 0(0) | 1... .. .1..1.11...1..1..1 | CHBSTATE | Channel adapter outbound state field. Attention needs to be presented to host. Attention delay active. (Reserved). Allow attention time-out. Attention has been presented. (Reserved). COC is active. Channel work queue is active. |
| 1(1) | 1... .. .1..1.11...1..1..1 | CHBTRIG | Channel trigger field. Next BTU has been rejected because of slowdown. Reject the next BTU because of slowdown. Slowdown mode indicator. Switch-in-progress flag. Terminate flag. Secondary Read pending flag. (Reserved). Switch Read pending flag. |

**CHANNEL CONTROL BLOCK EXTENSION FOR
SECONDARY CHANNEL ADAPTER**

**CHB
(ext.)**

Size in bytes: 128(80)

Created by: NCP generation

Pointer to CHB extension: CHBSCBA field in CHB.

Function: Contains the parameters and control fields used by the type 2 channel adapter I/O supervisor when switching primary and secondary channel adapters.

| | |
|---|--|
| 0(0) (Reserved) | |
| 4(4) CHBSXR50 Save area for external register X'50' | 6(6) CHBSXR51 Save area for external register X'51' |
| 8(8) CHBSXR53 Save area for external register X'53' | 10(A) CHBSXR54 Save area for external register X'54' |
| 12(C) CHBSXR55 Save area for external register X'55' | 14(E) CHBSXR56 Save area for external register X'56' |
| 16(10) CHBSXR57 Save area for external register X'57' | 18(12) CHBSXR5C Save area for external register X'5C' |
| 20(14) CHBSICV Value of secondary CA's INCWAR. | 22(16) CHBSOCV Value of secondary CA's OUTCWAR. |
| 24(18) CHBSSINA Address of an In CW for reading switch commands. | 26(1A) CHBYRPR Address of Out CW for response BTU indicating that the old secondary is now the primary. |
| 28(1C) CHBYRSR Address of Out CW for response BTU indicating that the old primary is now the secondary. | 30(1E) CHBSSATA Address of Out CW for response BTU indicating that attention time-out has expired on the primary CA. |
| 32(20) CHBSBPT Pointer to secondary channel adapter buffer. | |

| | |
|---------|---|
| 36(24) | (Reserved). |
| 40(28) | CHBSINCW In CW with zero count override for switch commands. |
| 44(2C) | Area for building CW to transfer pad before response BTU 1. |
| 48(30) | CHBPRCW Out-stop CW with no chaining for response BTU 1. |
| 52(34) | Area for building CW to transfer pad before response BTU 2. |
| 56(38) | CHBSRCW Out-stop CW with no chaining for response BTU 2. |
| 60(3C) | Area for building CW to transfer pad before response BTU 4. |
| 64(40) | CHBSARCW Out-stop CW with no chaining for response BTU 4. |
| 68(44) | CHBSRSP1 Response BTU 1 - indicates that the old secondary is now the primary. |
| 82(52) | CHBSRSP2 Response BTU 2 - indicates that the old primary is now the secondary. |
| 96(60) | (Reserved) |
| 110(6E) | CHBSRSP4 Response BTU 4 - indicates that attention time-out has expired on the primary CA. |
| 124(7C) | (Reserved). |

CHANNEL VECTOR TABLE

CHVT

Size in bytes: Variable, depending on number of subchannels specified.

Located: On the first doubleword boundary following the end of the line vector table.

Created by: NCP and EP generation.

Referenced by: Level 3 routines.

Function: Allows the level 3 routines to find a line's CCB when only the subchannel address is known. The user specifies one entry for each subchannel. The algorithm for computing the location of an entry is $CYACHVTA + [2 * (ccc-bbb)] + 2$, where ccc is the known subchannel address and bbb is the value contained in the first byte of the table.

| | | |
|---|--|---|
| 0(0) CYACHVT Subchannel addresses. Lowest subchannel address. Highest subchannel address. | | 2 thru n** CYACHEND Address of the associated LNVT entry for each of the line adapter interfaces (each address occupies 2 bytes). |
| n+1 CYAWRAP* Associated LNVT entries of the WRAP lines. | | CYASCAN* Initialization data. |

*Indicates a byte expansion follows.

**n = the number of line adapter interfaces multiplied by two (2), plus one (1).

Byte Expansions

| Offset | Field Name | Contents |
|--------------------------------|------------|--|
| (n+1) - (n+2) (n+3) - (n+2) | CYAWRAP | Associated LNVN entries of the WRAP lines. |
| (n+5) - (n+6) | | 1st scanner wrap line address. |
| (n+7) - (n+8) | | 2nd scanner wrap line address. |
| | | 3rd scanner wrap line address. |
| | CYASCAN | 4th scanner wrap line address. |
| | | Initialization data. |
| (n+9) | | 1st scanner scan limit. |
| (n+A) | | 2nd scanner scan limit. |
| (n+B) | | 3rd scanner scan limit. |
| (n+C) | | 4th scanner scan limit. |
| (n+D) | | Substitution control for all scanners. |

Size in bytes: Variable.

Located in: DVB

Created by: NCP generation.

Pointer to CIE: DVBDIAL field in DVB.

Function: Contains optional data required for servicing calls originated by a terminal on a switched line.

| | |
|---|---|
| 0(0)*** | |
| CIEMTAP Pointer to MTA list (last 18 bits). Included only if the device type is multiple terminal access. | |
| ----- | |
| or | |
| CIEIDL Pointer to ID list (IDL) (last 18 bits). Included only if ID verification is used on the associated line. | |
| ----- | |
| CIEFLAGS* Flags. The bit definitions in this field must be identical to those in the COEFLAGS of the call-out extension (COE). | |
| 4(4)** CIEIDCT Count of send ID. | 5(5)** CIEIDPTR Pointer to the ID to be sent. |

*Indicates a byte expansion follows.

**These fields are present in the CIE only if sending of the control unit's identification is required for this device.

***Actual position depends on other extensions that are present. The CIE follows any polling, addressing, or input extensions to the DVB.

Byte Expansion

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|--|------------|---|
| 0(0) | 1... .. .1...1...1... 1...1..1.1 | CIEFLAGS | Flags. Send hardware ID is required. Receive hardware ID is expected. Dial digits are resident. Call-in device (This bit is always one for CIE). (Reserved) A dial request is pending for this device. Disconnect with end of call has been received. Set Mode is required at telephone connection with this device to set up proper physical line characteristics. |

Size in bytes: 128(80)

Created by: NCP generation.

Pointer to COB: CHSVH2 field in XDH.

Function: Contains the parameters and control fields used by the type 1 channel adapter I/O supervisor.

COB Prefix

| | |
|----------|---|
| -32(-20) | CXCAWQ Channel work QCB. (For format, see Queue Control Block for Work Queues.) |
| -24(-18) | CXCAHQ Channel hold QCB. (For format, see Queue Control Block for Work Queues.) |
| -16(10) | CXCAECB Event control block for leasing buffers. (For format, see Event Control Block.) |
| -8(8) | Character ID (XXCXTCOB) for use in locating the COB in a storage dump. |

| | | | |
|-------|---|-------|--|
| 0(0) | COBCND* Channel condition flags. | 2(2) | COBICND Value of condition flags on last entry. |
| 4(4) | COBXR77 Save area for external register X'77'. | 6(6) | COBXR60 Save area for external register X'60'. |
| 8(8) | COBXR61 Save area for external register X'61'. | 10(A) | COBSR62I Save area for input from external register X'62'. |
| 12(C) | COBXR62O Save area for output to external register X'62'. | 14(E) | COBXR63 Save area for external register X'63'. |

*Indicates a byte expansion follows.

| | | | |
|--------|---|----------------------|---|
| 16(10) | COBXR64 Save area for external register X'64'. | 18(12) | COBXR65 Save area for external register X'65'. |
| 20(14) | COBXR66 Save area for external register X'66'. | 22(16) | COBXR67 Save area for external register X'67'. |
| 24(18) | COBSENSE Sense byte to transfer for sense com- mands. | 25(19) (Reserved) | 26(1A) COBCCMD Current channel command. |
| 28(1C) | COBERPSV Error recovery procedure save area. | | |
| 32(20) | COBRELSV Release subroutine save area. | | |
| 36(24) | COBNINSV Save area for inbound BTU processor. | | |
| 40(28) | COBLESV Lease subroutine save area. | | |
| 44(2C) | COBPIB Address of first inbound buffer. | | |
| 48(3C) | COBIPBF Pointer to previous inbound buffer. | | |
| 52(34) | COBCIB Pointer to current inbound buffer. | | |
| 56(38) | COBCID Current displacement in inbound buffer. | | |
| 60(3C) | COBCBLK Address of the last complete BTU given to the system router. | | |

| | | | |
|--|--|--|----------------------|
| 64(40) COBIBCD Number of data bytes in current BTU. | | 66(42) COBMDO Maximum data count for current in-bound buffer. | 67(43) (Reserved) |
| 68(44) COBMLCNT NCP generated buffer lease count for in-bound data. | 69(45) COBCLCNT Current buffer lease count. (Same as COBMLCNT except during slowdown, when this field equals one.) | 70(46) COBECBAD Address of ECB for leasing buffer. | |
| 72(48) COBWQAD Address of channel adapter work QCB. | | 74(4A) COBHQAD Address of channel adapter hold QCB. | |
| 76(4C) COBOXSV Save area for outbound transfer routine. | | | |
| 80(50) COBROTSV Refresh outbound transfer routine save area. | | | |
| 84(54) COBOBLKA Outbound BTU address. | | | |
| 88(58) COBOBUFA Pointer to current outbound buffer. | | | |
| 92(5C) COBODATA Current displacement in outbound buffer. | | | |
| 96(60) COBFCCW Number of host buffers allocated per read list. | | 98(62) COBRCCW Number of host CCWs remaining in read list. | |
| 100(64) COBFHAC Host buffer size in bytes | | 102(66) COBRHAC Number of bytes remaining in host buffer. | |
| 104(68) COBRDCNT Outbound buffer residual data count. | | 106(6A) COBOXCNT Number of bytes to be transferred on next outbound data service. | |

| | | |
|---|-----------------------|---|
| 108(6C) COBATTO Attention time-out duration. | | 110(6E) COBHPTR Pointer to dummy header buffer. |
| 112(70) Dummy header buffer. | | |
| 116(74) COBHPAD Number of bytes in access method pad 0. | 117(75) (Reserved) | 118(76) COBTPTR Pointer to dummy text buffer. |
| 120(78) Dummy text buffer. | | |
| 124(7C) COBTPAD Number of bytes in access method pad 1. | 125(7D) (Reserved) | 126(7E) COBDELAY Attention delay duration. |

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|------------|----------|
| 0(0) | Byte 0 1... .. .1...1...1...1... .. | | |

Size in bytes: Variable, depending on length of dial digits.

Located in: DVB

Created by: NCP generation.

Pointer to COE: DVBDIAL field in DVB.

Function: Contains optional data required to call a terminal on a switched line.

| | | | |
|--|--|--|---|
| 0(0)** <div style="text-align: center;">COESGTP</div> <div style="text-align: center;">Address of device's switched group table (SGT) (last 18 bits).</div> | | | |
| COEFLAGS* Flags. The bit definitions of this field must be identical to those in the CIEFLAGS field of the CIE. | | | |
| 4(4)** COELCSTI Index to LCST (MTA only). | 5(5)** COEMAX Maximum field length of dial digits. | 6(6)** COECUR Current number of dial digits. | 7(7)** COEDIAL Dial digits. (Variable length) |

*Indicates a byte expansion follows.

**Actual position depends on other extensions that are present.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|--|------------|---|
| 0(0) | 1... .. .1...1...1...1...1..1.1 | COEFLAGS | Flags Send hardware ID is required Receive hardware ID is expected. Dial digits are resident. Call-in device. This bit is always zero for COE. (Reserved) A Dial request is pending for this device. Disconnect with End of Call has been received. Set mode is required at telephone connection with this device. |

CHECK RECORD POOL**CRP**

Size in bytes: Variable (header = 10 bytes; each entry = 18-25 bytes).

Created by: NCP generation.

Pointer to CRP: SYSCKRP field in HWE.

Function: Contains check records that have not yet been processed. These records are generated by program level 1 and 3 error handling routines and are processed by a program level 5 routine (CXDIERT) that prepares buffers for transfer to the host as unsolicited MDR (miscellaneous data recorder) records.

Header

| | |
|---|--|
| 0(0) CRPL1PTR Pointer to next record unit to be used by level 1. | 2(2) CRPT1PTR Pointer to the next level 1 unit to be serviced by CXDIERT. |
| 4(4) CRPL3PTR Pointer to next record unit to be used by level 3. | 6(6) CRPT3PTR Pointer to the next level 3 unit to be serviced by CXDIERT. |
| 8(8) CRPSTAT1* Trigger control byte. | 9(9) CRPSTAT2 (Reserved) |

Entry Format

| | |
|---|--------------------------|
| 0(0) CRPCTL CRP control bytes. | |
| CRPLNG* Length of the MDR data. | CRPFLG* CRP flag byte |

Start of MDR Data (CRPDATA).

| | | | |
|---|---|--|--|
| 2(2) CRPABMAL Abend malfunction code. | | | |
| 4(4) CRPREC* The recording mode byte. (For values, see table.) | 5(5) CRPID MDR record ID field. The 3705 MDR record is always X'05'. | 6(6) CRPBERT* Box error record type code. | 7(7) CRPLCRT Lost check record counter. |

8(8)

Up to 19 bytes of formatted information. Remainder of MDR data. (Varies according to type of error.)

*Indicates a byte expansion follows.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|------------------|--|------------|--|
| 8(8) (Header) | X'00' X'80' | CRPSTAT1 | Trigger control byte. Trigger of CXDIERT is required. Trigger of CXDIERT is not required. |
| 0(0) | X'04' X'12' X'12' X'12' X'12' X'12' X'12' X'12' X'14' X'14' X'18' X'18' X'19' X'19' | CRPLNG | Length of MDR data Invalid record. Type 1 channel adapter. Type 1 scanner. Type 2 scanner-1. Type 2 scanner-2. Type 2 scanner-3. Type 2 scanner-4. Invalid operation code. Input/Output instruction exception. Unresolved program level 1 interrupt. Unresolved program level 3 interrupt. Type 2 channel adapter-1. Type 2 channel adapter-2. Permanent line errors. Line statistics. |
| 1(1) | 1...1.1 | CRPFLG | CRP flag byte. End of check record pool. (bits 1-5 reserved) Record is being serviced by CXDIERT. Check record unit has been used {filled}, requires service. |

| | | | |
|------|---|----------|--|
| 4(4) | X'00' X'01' X'10' X'10' X'10' X'11' X'11' X'11' X'11' X'11' X'12' X'12' X'13' X'13' X'FF' | CRPREC | Recording mode. Permanent line errors. Line statistics. Type 1 channel adapter. Type 2 channel adapter-1. Type 2 channel adapter-3. Type 1 scanner. Type 2 scanner-1. Type 2 scanner-2. Type 2 scanner-3. Type 2 scanner-4. Invalid operation code. Input/Output instruction exception. Unresolved program level 1 interrupt. Unresolved program level 3 interrupt. Invalid record. |
| 6(6) | X'01' X'02' X'03' X'04' X'08' X'08' X'10' X'20' X'40' X'84' X'C0' | CRPBERT | Box error record type code. Unresolved program level 1 interrupt. Type 2 channel adapter-2. Unresolved program level 3 interrupt. Type 2 channel adapter-1. Type 2 scanner-4. Invalid operation code. Type 2 scanner-3. Type 2 scanner-2. Type 2 scanner-1. Type 1 channel adapter. Type 1 scanner. |
| 7(7) | xxxx xxxx | CRPLCRCT | Lost check record counter. Number of records lost immediately preceding this record. Number of records lost while waiting for this record to be transferred to the host. Records are lost when the CRP is full and level 5 is unable to free up a unit by transferring a record to the host. |

COMMAND TABLE

Cmd. Tbl.

Size in bytes: 48

Located in: Routine CYAIS of module CYASVC.

Created by: NCP & EP generation.

Updated by: N/A

Referenced by: ICP

Function: Contains the CCB command codes used for translating the 8-bit command code into the 5-bit CCB command code.

0-47(0-2F)

CMDTABLE
CCB command codes. (See Appendix C)

**COMMUNICATION LINES TIMER AND RAS
CONTROL TABLE**

CTB

Size in bytes: 7(7)

Created by: NCP generation.

Pointer to CTB: None. See link edit map.

Function: Indicates end of timer resolution queues. This table must be located at least 25 bytes from start of a CSECT.

| | | | |
|---|---------------------|---------------------------------------|--|
| 0(0) CTBDCCB Dummy character control block address. | | 2(2) CTBDWORK Dummy work entry. | |
| 4(4) CTBUXREM Dummy CCBTOREM. | 5(5) (Reserved). | 6(6) (Reserved). | |

Size: Variable, depending on addressing characters.

Located in: DVB

Created by: NCP generation.

Pointer to DAE: (None.) Immediately follows polling extension; if no polling extension is present, the DAE immediately follows the DVB.

Function: Contains addressing characters for a device.

| | | |
|--|---|--|
| 0(0)* DAEOSP Device output delay. | 1(1)* DAEACUR Current number of addressing characters | 2(2)* DAEADDR Addressing characters. (DVBAO field in the DVB points here.) (variable length) |
|--|---|--|

*Actual position depends on the extensions that are present.

DEVICE INPUT AREA

DIA

Size in bytes: 9(9)

Located in: DVB extension.

Created by: NCP generation.

Pointer to DIA: DVBINVO field in DVB.

Function: Contains information about input devices.

| | | | |
|--|---|--|---|
| 0(0)** | | DIARVTE Address of RVT entry (last 18 bits). | |
| ----- DIASA Invite command save area. ----- or DIAMOD Command modi- fiers. | 1(1)** DIAFLAG Flags. (See BCUFLAGS for bit definitions; bits 6 and 7 are used as part of RVT entry ad- dress.) | | |
| 4(4)** | | DIASEQ Command sequence number. | 6(6)** DIASRC Source name field. |
| 8(8)** | DIARD* Record defini- tion. | | |

*Indicates a byte expansion follows.

**Actual position depends on other extensions that are present.

Byte Expansion

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|------------|--|
| 8(8) |1..100111 | DIARD | Record definition. EOB = EOT Message. Block. Transmission. |

Size in bytes: 24 (18)

Created by: NCP generation.

Pointer to DRS: SYSDRSP field in HWE.

Function: Contains addresses of appendage routines to be given control by CXCCPSUP.

| | |
|---|---|
| 0(0) CTXDRS Set to zero. | 2(2) DRSICW Address of ICW display routine. |
| 4(4) DRSICWA Address of ICW display routine. | 6(6) (Reserved) |
| 8(8) (Reserved) | 10(A) (Reserved) |
| 12(C) DRSTBL Table of display/refresh/select control values used by individual appendage routines. (length of 12 bytes) | |

DEVICE BASE CONTROL BLOCK

DVB

Size in bytes: Variable, depending on extensions present.

Created by: NCP generation.

Pointer to DVB: RVTRP field; LCBDVBP field of LCB during session.

Function: Serves as the base for all component, terminal, and device control unit representations. It includes queue control blocks plus all parameters required by a device.

Device Work QCB (See QCB for Work Queues for all bit definitions.)

| | |
|--|--|
| 0(0) DVQ1ECB Pointer to first element queued. (Shifted address.) | 2(2) DVQLECB Pointer to last element queued. (Shifted address.) |
| 4(4) DVQSTAT Task and queue status. | 5(5) DVQPRKEY Protection key. |
| 6(6) DVQLINK Pointer to next QCB on the queue. (Shifted address.) | |

Device Input QCB (See QCB for Input Queues for all bit definitions.)

| | |
|--|--|
| 8(8) DVI1ECB Pointer to first element queued. (Shifted address.) | 10(A) DVILECB Pointer to last element queued. (Shifted address.) |
| 12(C) DVISTAT Task and queue status. | 13(D) DVIPRKEY Protection key. |
| 14(E) DVILINK Pointer to next QCB on the queue. (Shifted address.) | |
| 16(10) DVITSKEP Task entry point (last 18 bits). | |
| DVIMCBD Major control block displacement | 17(11) DVISCHED Task dispatching priority. |
| 20(14) DVISAVE Address of save area push-down list. (Shifted address.) | 22(16) DVILUNK Pointer to previous QCB on the queue. (Shifted address.) |
| 24(18) DVIBHSET BH set (or BHR) address (last 18 bits). | |
| DVIBHRST BHR status bits. | 25(19) DVIBHSCH BHR scheduling bits. |

| | | |
|---|---|---|
| 28(1C) DVBRID Device resource ID. | 30(1E) DVBFEAT1* Device features byte 1. | 31(1F) DVBFEAT2* Device features byte 2. |
|---|---|---|

End of Device Input QCB

| | | | |
|---|--|--|---|
| 32(20) DVBPTR Auxiliary pointer (last 18 bits). If device is component, this field contains pointer to shared terminal DVB. If device is terminal, this field contains a pointer to line LCB. | | | |
| DVBTYPE* Device type. | | | |
| 36(24) DVBSDRT Transmission counter or pointer to OLTT control block, if in test mode. | | 38(26) DVBSORE Temporary error counter. | 39(27) DVBINVO Offset to device input area (DIA). |
| 40(28) DVBBHRO Offset to BHR extension. | 41(29) DVBBUO Offset to switched backup extension (BUE). | 42(2A) DVBDIAL Offset to call-in or call-out extension (CIE or COE). | 43(2B) DVABNM* Abnormal mode indicators. This field is meaningful only when a reset is in progress. Bits 2-7 have the value of the command modifiers when a reset is in progress. Bits 0-1 indicate that a deactivation is in progress. |

Service Seeking Control Block (SSC)

| | | |
|--|---------------------------------------|--|
| 44(2C) DVBSTAT* Status byte 1. | 45(2D) DVBSTAT2* Status byte 2. | 46(2E) DVBDMF Device mode flags. |
| 48(30) DVBPCC Pending contact count. | 49(31) DVBCPI (Reserved). | |

Polling/Addressing Extension

This extension is present only if the device requires polling or addressing or both.

| | | | |
|--|--|---|---|
| 50(32) DVBTLM Transmission limit. | 51(33) DVBCNT Transmission counter. | 52(34) DVBAO Offset from DVBCNT to first addressing character in DAE. | 53(35) DVBCLSO Cluster general poll extension (CGP) off- set. |
|--|--|---|---|

Polling Extension

The following fields are present only if polling of device is required. (If this area is included, the device input extension (DIA) must also be included.)

| | |
|---|---|
| 54(36) DVBCUR Number of poll- ing characters excluding ENQ. | 55(37) DVBPOLL Polling characters. (Variable length.) |
|---|---|

Remote 3704/3705 Extension

The following fields are present only if a remote 3704/3705 is being defined. (NCP/VS only.)

| | | | |
|--|---|---|--|
| 50(32) DVBCMD DVB command field. | 51(33) DVBCMDS DVB command status. | 52(34) BOQ1ECB Pointer to first element queued. | |
| 54(36) BOQLECB Pointer to last element queued. | | 56(38) BOQSTAT Task and Queue status. | 57(39) BOQPRKEY Protection key. |
| 58(3A) BOQLINK Pointer to next QCB on queue. | | 60(3C) DVBMOUT Maximum out- standing. | 61(3D) DVBCOUT Current outstanding. |
| 62(3E) DVBPNS Sequence num- ber at time of poll. | 63(3F) DVBSCT Sequence count control. | 64(40) DVBCHL C field hold area. | 65(41) DVBAFLD Secondary station address. |
| 66(42) DVBCMHLD Command Re- ject - command hold area. | 67(43) DVBCMDRY Command Re- ject - 'why' byte. | 68(44) DVBSDLF* SDLC flags. | |
| 70(46) DVBRNODE Node portion of remote resource ID. (Left justi- fied.) | 71(47) DVBRIDR Node portion of remote resource ID. (Right justi- fied and multi- plied by 4.) | 72(48) (Reserved) | 73(49) DVBSDL* Modes. |

*Indicates a byte expansion follows.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|--|------------|--|
| 30(1E) | 1... .. .1...1...1...1...1...1...1... .. | DVBFEAT1 | Device features byte 1. Block limit - BSC patch control. (NCP/VS) Conversational capability. Buffered receive. General poll. Batched message input. Carriage return delay. (NCP/VS) Text time-out suppression. Break-terminal originated data; transfer can be interrupted. |
| 31(1F) | 1... .. .1...1...1...1...1...1...1... .. | DVBFEAT2 | Device features byte 2. No critical situation notification. 1050 Auto EOB feature. (NCP/VS) 1050 Receive Interrupt feature. (NCP/VS) SDLC Selective Reject capability. (NCP/VS) Device on fan-out modem. (NCP/VS) Input extension exists (DIA). Addressing extension exists (DAE). Polling information exists. |
| 32(20) | X'48' X'80' X'82' X'84' X'85' X'87' X'88' X'89' X'8A' X'8B' | DVBTYPE | Device type. Components 2980 Non-BSC Terminals MTA 1050 2740, Model 1. 2741 2740, Model 2. 115A 83B3 TWX WTTY |

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|---------------|---|
| | X'29' X'4C' X'C0' X'C1' X'C2' X'C3' X'C4' X'C5' X'C6' X'C7' X'C8' X'C9' X'CA' X'CB' X'CC' X'CD' X'CE' X'CF' X'D0' | | BSC Terminals Remote 3705 (NCP/VS) 3275, 3277, 3284, 3286 Logical connection terminals. 1130 1800 2701 2703 2715 2770 2780 2972 3705 2020 2025 3271, 3275 3780 3735 3741 (NCP/VS) 3747 (NCP/VS) |
| 43(2B) | 1... .. .1...1...1...1...1...1...1...1... .. | DVBABNM | Abnormal mode indicators. Deactivate device in progress. Deactivate line orderly in progress. Reset at end of command in progress. Reset conditional in progress. (Reserved). Reset immediate in progress. Reset device queue in progress. Critical situation notification device serviced. |
| 44(2C) | 1... .. .1...1...1...1...1...1...1...1... .. | DVBSTAT | Status byte 1. Service seeking skip bit. Contact pending. Device active, accept TP commands. Disconnect received. A disconnect has been received for the last session and an initiation command may now be accepted. Any non- session initiating TP command should be refused. In session. Device in abnormal mode (reset or deactivate device in progress). Connection exists. Invite pending. |

| | | | |
|--------|---|---------|--|
| 66(42) | <p>Byte 0</p> <p>1... .. .1...1...1...1...1...1...1</p> <p>Byte 1</p> <p>..1...1... ..</p> | DVBSDLF | <p>SDLC flags. (NCP/VS)</p> <p>No queue flag. Receive Not Ready (RNR) command received. Command reject required. Abort verify. IPL lock. ERP lock. Remote in slowdown. Reject required.</p> <p>Transmit skip flag. Poll skip flag. (Bits 0-1 and 4-7 reserved).</p> |
| 69(45) | <p>1... .. .1...00...10...11... ..</p> | DVBSDLM | <p>Modes. (NCP/VS)</p> <p>IPL mode. Initial command mode. Set normal response mode (SNRM). Set asynchronous response mode (SARM). Set disconnect response mode (SDRM).</p> |

EVENT CONTROL BLOCK

ECB

Size in bytes: 8(8)

Located in: Dynamically allocated BCU buffer or as a permanent control block in storage.

Created by: NCP generation or dynamically as part of first buffer in a BCU.

Pointer to ECB: None.

Function: To control BCU status or event status of an associated block.

| | | |
|--|--|---|
| 0(0) ECBCSTAT ^{1,2} BCU status byte; valid only for ECBs con- tained in buff- ers. | 1(1) ECBESTAT ^{1,2} Event status byte | 2(2) ECBECHN ¹ ECB chain pointer. (Shifted address.) |
| 4(4) ECBTMINT ¹ Set time interval as specified by SETIME macros. ----- or ECBTNCT ¹ BCU text count. | 6(6) ECBWQCB ¹ Address of waiting task's input QCB. (Shifted address.) | |

¹See block control unit for labels used in the first buffer of a BCU.

²Indicates a byte expansion follows.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|--|------------|--|
| 0(0) | 1... .. | ECBCSTAT | BCU status byte. BCU enqueued. (Bits 1-7 reserved) |
| 1(1) | 1... .. .1...1...1... .. | ECBESTAT | Event status byte. Event satisfied. Task ready to be dispatched. Supervisor link. ECB enqueued bit. (bits 4-7 reserved) |

EBCDIC CHARACTER DECODE DISPLACEMENT TABLE

ECDDT

Size in bytes: 64(40)

Located in: Module CYABL.

Created by: NCP and EP generation.

Updated by: N/A

Referenced by: CYATADAO, CYARAPHI.

Function: Provides offset into branch table for proper control character processing.

0-3F(0-63)

EBCXMTBT
Displacement data.

Size in bytes: 48(30)

Created by: NCP generation.

Pointer to HWE: SYSW6 field in XDA.

Function: Contains frequently accessed system halfword control fields.

| | | | |
|--------|---|--------|---|
| 0(0) | SYSBUFCT Initial free buffer count. | 2(2) | SYSBPQBC Exit slowdown threshold count. |
| 4(4) | SYSATBP Address trace block pointer. | 6(6) | SYSCKRP Check record pool pointer. |
| 8(8) | SYSLTBP Line trace block pointer. | 10(A) | SYSDRSP Display/refresh/select table pointer. |
| 12(C) | SYPDBP Panel control block pointer. | 14(E) | SYSEBCP EBCDIC time and date control block pointer. |
| 16(10) | SYSTVSP Time value select table pointer. | 18(12) | SYSLCSP Line control select table pointer. |
| 20(14) | SYSOQ Channel work queue pointer. | | |
| 24(18) | SYSCRNP Channel normal data pointer. | | |
| 28(1C) | SYSANSP Auto-network shutdown queue pointer. | | |
| 32(20) | SYSERTP Error record transfer queue pointer. | | |
| 36(24) | SYSPCBP Panel queue pointer. | | |
| 40(28) | SYSTMTP Timer completion queue pointer. | | |
| 44(2C) | SYSNIQP Non-device input queue pointer. | | |
| 48(30) | SYSCHVTP Pointer to EP channel vector table. (NCP/VS) | | |

Size in bytes: 128(80)

Located in: Routine CYAIS of module CYASVC.

Created by: NCP and EP generation.

Referenced by: Routine CYAIS of module CYASVC.

Function: Points to ICE routines for command processing.

| | |
|--|--|
| 0-47(0-2F) | |
| ICEADDR | |
| ICE routine address pointers. | |
| 0(0) | |
| Address pointers (2) to Test I/O. (general) (ICETIO) | |
| 4(4) | 6(6) |
| Address pointer to Write. (BSC) (ICEWRIBS) | Address pointer to Write. (Start-stop) (ICEWRISS) |
| 8(8) | 10(A) |
| Address pointer to Read. (BSC) (ICEREABS) | Address pointer to Read. (Start-stop) (ICEREASS) |
| 12(C) | |
| Address pointers (2) to no-op. (general) (ICENOP) | |
| 16(10) | |
| Address pointers (2) to Sense. (general) (ICESEN) | |
| 20(14) | |
| Address pointers (2) to Wrap. (general) (ICEWRA) | |
| 24(18) | 26(1A) |
| Address pointer to Prepare. (BSC) (ICEPREBS) | Address pointer to Prepare. (Start-stop) (ICEPRESS) |
| 28(1C) | |
| Address pointers (2) to Invalid Code. (CMDERROR) | |
| 32(20) | 34(22) |
| ERROR | ERROR |
| 36(24) | 38(26) |
| Address pointer to Poll (BSC) (ICEPOLBS) | Address pointer to Poll. (Start-stop) (ICEPOLSS) |
| 40(28) | 42(2A) |
| Address pointer to Invalid Code. (CMDERROR) | Address pointer to Inhibit (or Read for start-stop). (ICEREASS) |
| 44(2C) | |
| ERROR | |
| 52(34) | 54(36) |
| Address pointer to Invalid Code. (CMDERROR) | Address pointer to Break. (Start-stop) (ICEBREBS) |
| 56(38) | 58(3A) |
| Address pointer to search. (BSC) (ICESEABS) | Address pointer to search. (Start-stop) (ICESEASS) |

| | | | |
|---------|---|---------|---|
| 60(3C) | | ERROR | |
| | | 76(4C) | Address pointer to Set Mode (BSC) (ICESETBS) |
| 78(4E) | Address pointer to Invalid Code. (CMDERROR) | 80(50) | |
| | | | |
| ERROR | | | |
| 92(5C) | Address pointer to Enable. (BSC) (ICEENABS) | 94(5E) | Address pointer to Enable. (Start-stop) (ECEENASS) |
| 96(60) | | | |
| ERROR | | | |
| 100(64) | Address pointer to Dial. (BSC) (ICEDIABS) | 102(66) | Address pointer to Dial. (Start-stop) (ICEDIASS) |
| 104(68) | | | |
| ERROR | | | |
| 108(6C) | Address pointer to Invalid Code (CMDERROR) | 110(6E) | Address pointer to Write Break. (2848-BSC) (ICEBRESS) |
| 112(70) | Address pointer to Invalid Code. (CMDERROR) | 114(72) | Address pointer to Read Clear. (ICEPRESS) |
| 116(74) | | | |
| ERROR | | | |
| 120(78) | Address pointer to Adprep. (BSC) (ICEADPBS) | 122(7A) | Address pointer to Invalid Code. (CMDERROR) |
| 124(7C) | Address pointer to Disable. (BSC) (ICEDISES) | 126(7E) | Address pointer to Disable. (Start-stop) (ICEDISSS) |

Size in bytes: 64(40)

Located in: Routine CYAIS of module CYASVC.

Created by: NCP and EP generation.

Referenced by: Routine CYAIS.

Function: Contains address pointers to IFD and CAEC routines.

| 0-63(0-3F) | |
|---|---|
| IFDADDR IFD address table. | |
| 0(0) No action, TIO (00) command. (CAEC190) | 2(2) Address pointer for Write (08) com- mand. (IFDWRI) |
| 4(4) Address pointer for Read (10) com- mand. (IFDREA) | 6(6) No action, No-op (18) command. (CAEC190) |
| 8(8) Address pointer for sense (20) command. (IFDSFLG) | 10(A) No action, Wrap (28) command. (CAEC190) |
| 12(C) Address pointer for Prepare (30) command. (IFDPRE) | 14(E) ERROR (38) |
| 16(10) ERROR (40) | 18(12) Address pointer for Poll (48) com- mand. (IFDPOL) |
| 20(14) Address pointer for Inhibit (50) command. (IFDREA) | 22(16) ERROR (58) |
| 24(18) ERROR (60) | 26(1A) Address pointer for Break (68) com- mand. (IFDWRI) |
| 28(1C) Address pointer for Search (70) command (IFDREA) | 30(1E) ERROR (78) |
| 32(20) ERROR (80) | 34(22) ERROR (88) |
| 36(24) ERROR (90) | 38(26) Address pointer for Set Mode (98) command. (IFDSTMD) |
| 40(28) ERROR (A0) | 42(2A) ERROR (A8) |
| 44(2C) ERROR (B0) | 46(2E) Address pointer for Enable (B8) com- mand. (IFDENA) |

| | |
|---|---|
| 48(30) ERROR (C0) | 50(32) No action, Dial (C8) command. (CAEC190) |
| 52(34) ERROR (D0) | 54(36) Address pointer for Write Break (D8) command. (IFDWRI) |
| 56(38) Address pointer for Read Clear (E0) command. (IFDREA) | 58(3A) ERROR (E8) |
| 60(3C) Address pointer for Address Pre- pare (F0) command. (IFDWRI) | 62(3E) Address pointer for Disable (F8) com- mand. (CAEC190) |

Size in bytes: Variable

Created by: NCP generation.

Pointer to IDE: None. Follows IDL.

Function: Contains one entry for each valid ID that can be received over a line or lines for which the list is being used.

The IDE has the following format if device association is not possible.

| | | |
|---|----------------------------------|--|
| 0(0) IDELN ID length | 1(1) IDEFLAG* Entry flags. | 2(2) ID characters. (Variable length.) |
| ** IDEPADL Length of maximum number of pad characters needed for alignment. | | |

The IDE has the following format if device association is possible.

| | | |
|---|---|--|
| 0(0) | IDEDVBP Pointer to DVB (last 18 bits). | |
| <div><div>-----</div><div><div>IDELEN ID length</div><div>IDEFLAG* Entry flags.</div></div></div> | | |
| 4(4) | ID characters. (Variable in length.) | |
| ** | IDEPADL Length of maximum number of pad characters needed for alignment. | |

* Indicates a byte expansion follows.

**Follows ID characters.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|------------------------------------|------------|---|
| 1(1) | 1...1...1... .. | IDEFLAG | Entry flags. Device association is possible for this entry. End of list. Notify host if no match. (Meaningful only for first and last entries of list.) |

IDENTIFICATION LIST HEADER

IDL

Size in bytes: 4(4)

Located in: Beginning of identification list.

Created by: NCP generation.

Pointer to IDL: CIEIDL field in CIE.

Function: Precedes the first entry in an ID list for switched BSC lines whose terminals identify themselves. The list is required only if validity checking of the incoming ID is required.

| | |
|---|--|
| 0(0) IDLSIZE Maximum number of bytes in the list | 2(2) Halfword to force fullword alignment for first entry. |
|---|--|

Size in bytes: 36(24)

Created by: NCP generation.

Pointer to IOB: LCBACBP

Function: Contains status of I/O operations.

| | | |
|---|--|---|
| 0(0) IOBIMCTL* Immediate control flags. | 1(1) IOBCMAND* I/O command field. | 2(2) IOBCMODS* IOB command modifiers. |
| 4(4) IOBEXTST* Extended status field. Contains error indicators. | 5(5) IOBRDESC Record descriptor byte. | 6(6) IOBSTAT* Outcome of command operation. |
| 8(8) IOBEREST First error extended status. This field is set equal to IOBEXTST when the first recoverable error occurs. | 9(9) IOBRTYCT Retry count for first level ERP attempts. | 10(A) IOBERST First error status. This field is set equal to IOBSTAT when the first recoverable error occurs. |
| 12(C) IOBSTOFS Initial data offset, used to locate the starting point in the first buffer of a block. | 13(D) IOBOFSET Final data offset used to locate the buffer position of the last character in the block that was stored. Zero if buffer is filled. | 14(E) IOBDATAP Data pointer to first buffer in the block. (Shifted address.) |
| 16(10) IOBFNLPT Pointer to last buffer in chain (Shifted address.) | 18(12) IOBINPUT Input control data address. Contains the address of the first buffer when buffers are needed to store a reply to text, selection, or inquiry. (Shifted address.) | |

*Indicates a byte expansion follows.

| | | | |
|--|--|--|--|
| 20(14) | | IOBOUTPT | |
| Output control data address. For Write commands, contains the address of the text data in buffers. | | | |
| IOBCTCCT Control count. Number of characters to be transmitted from field addressed by the output control data address. | | 21(15) | Address of the field to be transmitted. |
| 24(18) | | 26(1A) | |
| IOBLCS Pointer to the line control block. (Shifted address.) | | IOBKSIZ Received block's size (number of data characters stored). | |
| 28(1C) | | | |
| IOBPOLL | | | |
| Address of the entry in the service order table for the next station to be polled minus two, used when the communications controller is the master station (last 18 bits). | | | |
| IOBSSCB Service seeking control byte. | | 29(1D) | 30(1E) |
| | | IOBMTASA MTA 1050 station address byte. | IOBTRADR Station select address for the communications controller when it is a tributary station. |
| 32(20) | | | |
| IOBSEL | | | |
| Address of the field that contains the selection address for the station to be selected by the communications controller (last 18 bits). | | | |
| IOBCRTN Carriage position. | | 33(21) | IOBPFLAG* PEP flag field. (NCP/VS) |

*Indicates a byte expansion follows.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|------------|--|
| 0(0) | 1... .. .1..1.1 1... | IOBIMCTL | Immediate control flags Reset immediate. Write request - conditional reset. Monitor mode. Send interrupt. Conditional send interrupt. (Bits 5-7 reserved). |
| 1(1) | X'10' X'12' X'16' X'17' X'19' X'25' X'27' X'28' X'2A' X'83' X'8D' X'8F' X'94' X'9B' X'AC' | IOBCMAND | I/O command field. Write initial. Write continue. Write recover. Write delay. (NCP/VS) Write. Read. Read delay. (NCP/VS) Read initial. Read continue. Disable. Enable. Dial. Write EOT. Write control. Read status. |

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|---------------|--|
| 2(2) | <p>Byte 0</p> <p>1... .. .1...1...1 ...</p> <p>.... 1... 1.. 1. 1</p> <p>Byte 1</p> <p>1... .. .1...1...1 ...</p> <p>.... 1... 1.. 1. 1</p> | IOBCMODS | <p>IOB Command Modifiers.</p> <p>Suppress lost data. Override text mode ERPs. Reject received leading graphics. Inhibit text time-out (start-stop). ITB mode not transparent (BSC). Sub-blocking mode. Inhibit WACK limit (BSC). Inhibit time fill (start-stop). Enable length check. ITB mode transparent. Hold buffers.</p> <p>Reset. Send priority. ETX (Write commands). Single poll (Read commands). Offset (Write commands). First buffer assigned (Read commands). Insert (Write commands). Send leading graphics (Read commands). Send identification (Enable). Transparent text (Write commands). Send positive ACK (Read commands). Identification mode (Enable). Set negative ACK (Read commands). SOH (Write commands). Multiple terminal access mode. (Enable commands.) Set alternate ACK.</p> |
| 4(4) | <p>1... .. .1...1...1 ...</p> | IOBEXTST | <p>Extended status field.</p> <p>Overrun/underrun. Line quiet time-out. DLE format exception. Sub-block error. (Bits 4-7 reserved).</p> |

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|------------------------------|------------|---|
| 6(6) | | IOBSTAT | Outcome of command operation. |
| | Byte 0 | Flags | |
| | 1... .. | | Extended error status. |
| | .1.. .. | | Format exception (bad line control sequence). |
| | ..1. | | Sync check (stop bit error start-stop only). |
| | ...1 | | Data check (block check character error). |
| |1 | | Length check. |
| | Read/Write Group Masks | | |
| | 000. | | No errors. |
| | 001. | | Receive text. |
| | 010. | | Receive text reply. |
| | 011. | | Receive control; command reject. |
| | 100. | | Status outstanding when command issued; command not executed. |
| | 101. | | Send text reply. |
| | 110. | | Send text. |
| | 111. | | Send control. |
| | Data Set Control Group Masks | | |
| | 000. | | No errors. |
| | 001. | | Receive ID. |
| | 010. | | Receive ID reply. |
| | 011. | | Connect. |
| | 100. | | Status outstanding when command issued. |
| | 101. | | Error in dialing phase. |
| | 110. | | Send ID. |
| | 111. | | Disconnect. |
| | | Byte 1 | |
| 33(21) | | IOBPFLAG | PEP flag field. (NCP/VS) |
| | 1... .. | | Line type: 0 = NCP 1 = EP |
| | .1.. .. | | PEP switchable line: 0 = Not switchable. 1 = switchable. |
| | ..1. | | Line-active save bit. 0 = Line inactive at time of switch. 1 = Line active at time of switch. |
| |1. | | Part of IOBSEL address |
| |1 | | Part of IOBSEL address. (Bits 3-5 reserved). |

LINE CONTROL BLOCK**LCB****Size:** Variable, depending on line-type extensions.**Created by:** NCP generation, one for each line.**Pointer to LCB:** RVTRP field in RVT.

Function: Contains fields required for (1) scheduling line operations, (2) maintaining line-significant status information, and (3) requesting I/O operations from the communications I/O program (levels 2 and 3).

Line I/O QCB (LCBLIOQ)
(See QCB for Input Queues for all bit definitions.)

| | | | |
|--|---|---|--|
| 0(0) LC1IECB Pointer to first element queued. (Shifted address.) | | 2(2) LCILECB Pointer to last element queued. (Shifted address.) | |
| 4(4) LCISTAT Task and queue status. | 5(5) LCIPRKEY Protection key. | 6(6) LCILINK Pointer to next QCB on the queue (Shifted address.) | |
| 8(8) LCITSKEP Task entry point. (last 18 bits) | | | |
| LCIMCBD Major control block displace- ment. | | 9(9) LCISCHED Trigger scheduling priority. | |
| 12(C) LCISAVE Address of save area push-down list. (Shifted address.) | | 14(E) LCILUNK Pointer to previous QCB on the queue. (Shifted address.) | |
| 16(10) LCIBHSET BHR or BH set address (last 18 bits). | | | |
| LCIBHRST BHR status bits. | | 17(11) LCIBHSCH BHR scheduling bits | |

Line Work QCB (LCBLWQ)
(See QCB for Input Queues for all bit definitions.)

Note: By format, this is an Input QCB. Line Work QCB is simply the name given to this particular Input QCB.

| | | | |
|--|--|---|--|
| 20(14) LCW1ECB Pointer to first element queued. (Shifted address.) | | 22(16) LCWLECB Pointer to last element queued. (Shifted address.) | |
|--|--|---|--|

| | | |
|---|--|--|
| 24(18) LCWSTAT Task and queue status. | 25(19) LCWPRKEY Protection key. | 26(1A) LCWLINK Pointer to next QCB on the queue. (Shifted address.) |
| 28(1C) LCWSKEP Task entry point (last 18 bits). | | |
| LCWMCBD Major control block displace- ment. | 29(1D) LCWSCHED Trigger scheduling priority. | |
| 32(20) LCWSAVE Address of save area push-down list. (Shifted address.) | 34(22) LCWLUNK Pointer to previous QCB on the queue. (Shifted address.) | |

| | |
|--|--|
| 36(24) LCBTEABR Remote pointer to receive SDLC. (NCP/VS) | |
| or | |
| LCBPEPSC Subchannel of EP equivalent line. (NCP/VS) | LCBACBP Pointer to adapter control block. |
| 40(28) LCBLTCTP Line type command table pointer (last 18 bits). | |
| LCBLSTAT* First line status byte. | |
| 44(2C) LCBDVBP Pointer to device base for device currently connected over line (last 18 bits). | |
| LCBTPEC* Line type code. | |
| or | |
| LCBRCBP Pointer to remote control block. (NCP/Vs) | |
| 48(30) LCBDBC Pointer to the Activate or Deactivate BCU when activate line, deactivate line orderly, or deactivate group orderly is in progress (last 18 bits). | |
| LCBLLGN LLG number. | |

| | | | |
|---|--|--|--|
| 52(34) LCBSSP Subtask sequence pointer. | | 54(36) LCBFEAT1* LCB features. | 55(37) LCBLST2* Second line status byte. |
| 56(38) LCBACTNS* Actions to be taken when unusual conditions arise on the line. | 57(39) LCBUSER Offset to beginning of user area. | 58(3A) LCBERPL Second level error recovery procedure loop limit. | 59(3B) LCBERPC Second level error recovery procedure loop counter. |
| 60(3C) LCBEDEL Duration of delay between second level ERP loops. | 61(3D) LCBCOFFL Sub-block cutoff limit. | 62(3E) LCBCOFFC Sub-block cutoff counter. | 63(3F) LCBIOCOM* I/O communication byte. |
| 64(40) LCBCSCNT Count of pending Invite and Contact commands for the line. | | 66(42) LCBRID Resource ID of the line. | |

Multipoint (Switched or Non-Switched) Extension

Line Suspended Sessions QCB. (LCBLSSQ)
(See QCB for Work Queues for all bit definitions.)

| | | |
|---|---------------------------------------|--|
| 68(44) LCS1ECB Pointer to first element queued. (Shifted address.) | | 70(46) LCSLECB Pointer to last element queued. (Shifted address.) |
| 72(48) LCSSTAT Task and queue status. | 73(49) LCSPRKEY Protection key. | 74(4A) LCSLINK Pointer to next QCB on the queue. (Shifted address.) |

| | | | |
|--|---|--|--|
| 76(4C) LCBESOTP Address of service order table (last 18 bits). | | | |
| LCBEPAUS Pause between passes through service order table. | | | |
| 80(50) LCBENAKL Negative poll response limit. | 81(51) LCBESERL Service seeking scan limit. | 82(52) LCBMS Maximum number of sessions allowed. | 83(53) LCBAS Attempted sessions count. |
| 84(54) LCBCS Suspended connections count. | 85(55) LCBWS Connections work count. | 86(56) LCBENOD Number of devices on this line. | 87(57) LCBEDIG Number of devices remaining when deactivating line. |

Switched Extension

| | |
|---|--|
| 68(44) LCBESGTP Address of primary switched group table (SGT) (last 18 bits). | |
| LCBEFLAG* Switched extension flags. | |
| 72(48) LCBELCDI Address of logical connection device input (LCDI) DVB. | |

Non-Switched Point-to-Point Extension

| |
|---|
| 68(44) LCBALT Alternate LCB address or address of switched group table. |
|---|

SDLC Trunk Extension (NCP/VS)

| | |
|---|--|
| 68(44) LCBTESCH Pointer to trunk scheduler. | |
| LCBTSTAT* SDLC trunk status flags. | |

| | | | |
|--------|---|--|--|
| 72(48) | | LCBTEABX ACB pointer (FDX write link). | |
| 76(4C) | | LCBTEALT Alternate trunk pointer. | |
| 80(50) | | LCBHACBP Hold area for primary ACB pointer. | |
| 84(54) | LCBTESOR SOT pointer. (Read link, primary only.) | 86(56) | LCBTESOW SOT pointer. (Write link, primary only.) |

*Indicates a byte expansion follows.

byte expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|------------|---|
| 40(28) | <p>1... ..</p> <p>.1... ..</p> <p>..1... ..</p> <p>...1... ..</p> <p>....1...</p> <p>.... .1..</p> <p>.... .1.</p> <p>.... .1</p> | LCBLSTAT | <p>First line status byte.</p> <p>Line active. A line is active (can accept TP commands) from the completion of an activate line operation until the receipt by line management of a deactivate line request. A line is inactive (cannot accept TP commands) from the receipt by line management of a deactivate line request until the completion of an activate line operation.</p> <p>Line is in abnormal mode.</p> <p>A Reset or Deactivate is in progress for some device on this line. See LCBLST2 to determine actual operation.</p> <p>Active session.</p> <p>Work scheduler idle.</p> <p>Service seeking in progress.</p> <p>Switched-enable is active on this line.</p> <p>Reset immediate or deactivate line halt caused an immediate XIO to be issued on this line. See LCBLST2 to determine actual operation.</p> <p>Online test mode.</p> <p>(Reserved)</p> |

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|---------------|--|
| 44(2C) | Byte 0 1... .. .1...1...1 1... 1..1..1 | LCBTYPEC | Line type code. (Reserved). Extension exists. The meaning of this bit is relevant only if bit 7 (switched) is one. If one, this line changes physical characteristics, via set mode, with each new telephone connection. If zero, line has same characteristic for every connection. SDLC (NCP/VS). Mode (NCP/VS): 0 = HDX 1 = FDX BSC Line. Multipoint line. Switched line. |
| 54(36) | 1... .. .1...1...1 1... 1 | LCBFEBT1 | LCB features. Multipoint tributary. Point-to-point secondary. Dial type (NCP/VS): 1 = auto 0 = manual Speed change capability. (NCP/VS) Alternate trunk capability. (NCP/VS) (Bits 5-6 reserved). Mode switch (NCP/VS): 1 = EP 0 = NCP |
| 55(37) | 1... .. .1...1...1 1...1..1..1 | LCBLST2 | Second line status byte. Deactivate line halt in progress. Deactivate line orderly in progress. Activate Line in progress. Current dial method (NCP/VS): 1 = auto 0 = manual Monitor mode in progress. (NCP/VS) Line mode bit (NCP/VS): 1 = backup 0 = normal Monitor reset bit (NCP/VS): 1 = delay monitor reset 0 = reset now Line speed change in progress. (NCP/VS) |

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|---------------|--|
| 56(38) | 1... .. .1...1...1... 1...1..1..1 | LCBACTNS | Actions to be taken when unusual conditions arise on the line. (Reserved). (Reserved). Service suspended sessions. Single service seek. Respond to current read with RVI. Negative poll response limit reached: 1 = break logical connection 0 = no break Negative poll response limit reached: 1 = reschedule Read 0 = terminate Monitor line for attention or disconnect. (NCP/VS) |
| 63(3F) | 1... .. .1...1...1... 1...1..1..1 | LCBIOCOM | I/O communication byte. Partial block sent. Session suspension required. Send ID. Transparent text selection. End of text block (ETB) received. Conversational mode. BHR point 2 execution required after I/O is completed. Last block ended with ETX. |

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|---------------|---|
| 68(44) | 1... .. .1..1.1 | LCBEFLAG | Switched extension flags. Part of a switched group. Call-in line. Call-out line. Telephone connection exists. (Bits 4-7 reserved). |
| 68(44) | 1... .. .1..1.1 1... | LCBTSTAT | SDLC trunk status flags. (NCP/VS) SDLC receive link: 1 = idle 0 = busy SDLC transmit link: 1 = idle 0 = busy SDLC trunk status: 1 = idle 0 = running RCB status: 1 = all RCBs are inactive 0 = all RCBs are not inactive Currently alternate trunk. |

Size in bytes: 16(10) per entry; number of entries defined at NCP generation.

Created by: NCP generation.

Pointer to LCST: SYSLCSP field in HWE.

Function: Used to change ACB control fields for Multiple Terminal Access (MTA).

Entry Format

| | | |
|---|--|--|
| 0(0) LCSTSPED Line speed. | 2(2) LCSTLGT Line group table address. | |
| 4(4) LCSTRTDT Receive translate decode table address. | 6(6) LCSTTTDT Transmit translate decode table address (high order byte). | 7(7) LCSTSMDE Set mode serial data (SDF) constant. |
| 8(8) LCSTSTBL State table address. | 10(A) LCSTRTRY Text error retry limit. | 11(B) LCSTBCUT Buffer cutoff limit (receive). |
| 12(C) LCSTCRTN Carriage return rate factor (SS only). | 13(D) LCSTLSIZ Maximum print line size (SS only). | 14(E) LCSTBG Background table address. |

LINE GROUP TABLE

LGT
(EP &
PEP)

Size in bytes: Variable (8 bytes per GROUP macro).

Created by: NCP and EP generation.

Located: Immediately following CCBs.

Updated by: CCB

Referenced by: LCP, ICP

Function: Contains information about a group of lines. It contains an entry for each GROUP macro coded by the user.

| | | |
|---|---|--|
| 0(0) LGTREPLY Reply time-out in tenths of a second. | 1(1) LGTTET Text time-out in tenths of a sec- ond. | 2(2) LGTCHARS Ending TTY characters. |
| 4(4) LGTLINE* Line information byte. | 5(5) LGTEOT End of transmis- sion for RPC and WTTY (optional). | 6(6) Reserved. |

*Indicates a byte expansion follows.

Byte Expansion

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|------------|--|
| 4(4) | ...11.. 1. 1 | LGTLINE | Line information byte. Presence of TTY ending characters: 0 = present 1 = not present. Line type: 0 = switched. 1 = non-switched XON character control: 0 = utilize 1 = inhibit XOFF character control: 0 = utilize 1 = inhibit |

LINE GROUP TABLE

LGT
(NCP)

Size in bytes: Variable depending on line type.

Created by: NCP generation.

Pointer to LGT: CCBLGPT field in CCB.

Function: Contains line control parameters.

| | | | |
|--|--|---|--|
| 0(0) LGTTYPE* Terminal type identification. | 1(1) LGTSHTAP Shoulder tap time-out state change mask. | 2(2) LGTENDR1 Receive text status/ERP vector. | |
| 4(4) LGTENDR2 Receive text reply status/ERP vec- tor. | | 6(6) LGTENDR3 Receive control reply status. | |
| 8(8) LGTTIMEA Control time-out command (error time-out). | 9(9) LGTTIMEB Receive text (long) time-out command. | 10(A) LGTTIMEC Transmit time- out command (shoulder tap). | 11(B) LGTTIMED Response time-out command. |
| 12(C) LGTXIPCF Transmit initial LCD/PCF value. | 13(D) LGTRIPCF Receive initial LCD/PCF value. | 14(E) LGTINST Initial level 2 state mask. | 15(F) LGTCMRTY Control mode ERP retry limit. |
| 16(10) LGTCMD Command decode table vector. | | 18(12) LGTINCHR Initial control character. | 19(13) LGTCOUNT Write EOT com- mand initial control character count. |

Type 1 Scanner Extension

| | | |
|---|--|--|
| 20(14) LGTMASK Character size tag mask. (See BCBMASK for bit definitions). | 22(16) LGTLCPCF LCD/PCF for type 1 scanner. (See BCBLPCF for bit defini- tions.) | 23(17) LGTBREAK Start-stop transmit break mask. (See BCBBMASK for bit definitions.) |
|---|--|--|

*Indicates a byte expansion follows.

| | | | |
|--|--|---|---|
| 24(18)** LGTWACKL BSC received WACK limit value. | 25(19)** LGTTTD BSC received TTD limit value. | 26(1A)** LGTSYN BSC SYN char- acter line code. | 27(1B)** LGTRIST Receive initial state, set after connect. |
| or LGTSELG Start-stop selec- tion address length. | or LGTPOLLG Start-stop poll address length. | or LGTPADCT Start-stop motor start pad count. | |

BSC Line and EBCDIC Characters

| | | | |
|------------------------------------|-------------------------------------|-----------------------------------|------------------------------------|
| 28(1C)** LGTDLBEB DLE. | 29(1D)** LGTETBE ETB EBCDIC. | 30(1E)** LGTDLBOT DLE. | 31(1F)** LGTEOTE EOT EBCDIC. |
| 32(20)** LGTDLBS DLE. | 33(21)** LGTSTXE STX EBCDIC. | 34(22)** LGTDLBIB DLE. | 35(23)** LGTITBE ITB EBCDIC. |
| 36(24)** LGTDLBO DLE. | 37(25)** LGTACKO ACKO. | 38(26)** LGTDLB1 DLE1. | 39(27)** LGTACK1 ACK1. |
| 40(28)** LGTDLR DLE. | 41(29)** LGTTRVIE RVI EBCDIC. | 42(2A)** LGTDLBEEQ DLE. | 43(2B)** LGTENQE ENQ EBCDIC. |
| 44(2C)** LGTNAKE NAK EBCDIC. | 45(2D)** LGTSOHE SOH EBCDIC. | 46(2E)** LGTDLBES DLE. | 47(2F)** LGTETXE ETX EBCDIC. |
| 48(30)** LGTDLBW DLE. | 49(31)** LGTWACK WACK. | 50(32)** LGTSOHA SOH ASCII. | 51(33)** LGTSTXA STX ASCII. |
| 52(34)** LGTETBA ETB ASCII. | 53(35)** LGTETXA ETX ASCII. | 54(36)** LGTBOTA EOT ASCII. | 55(37)** LGTITBA ITB ASCII. |
| 56(38)** LGTENQA ENQ ASCII. | 57(39)** LGTNAKA NAK ASCII. | 58(3A)** LGTDLBA DLE ASCII. | |

**Displacement will be four bytes less if type 1 scanner is not present.

Start/Stop Line and EBCDIC Control/Characters.
(Label used dependent on terminal type.)

| | | | |
|--|--|---|---|
| 28(1C)** LGTUPPER Upshift. | 29(1D)** LGTETB2 Circle B. | 30(1E)** LGTLOWER Down shift. or LGTEOT3 Letters. | 31(1F)** LGTEOT2 Circle C or H. or LGTTEOT EOT. |
| 32(20)** LGTEOT1 Circle C or figs. or LGTWFIG Figs. or LGTCIRC Circle C. | 33(21)** LGT CIRDC Circle D. or LGTWLTR Letters. or LGTTNUL Null. or LGTSTX1 Space or carriage return. | 34(22)** LGTVTAB Vertical tab. or LGTWNUL Null. or LGTTVT Vertical tab. | 35(23)** LGHTTAB Horizontal tab. or LGTTHT Horizontal tab. |
| 36(24)** LGT LF Line feed. or LGTW TAB Tab. or LGTSTX3 Line feed or letters. or LGTTLF Line feed | 37(25)** LGT CRLF Carriage return. or LGTWCR Carriage return. or LGTTTCR Carriage return. or LGTCRLF Carriage return or line feed. | 38(26)** LGTSPACE Space. | 39(27)** LGT BKSP Backspace. or LGTSTX2 Carriage return or line feed. |
| 40(28)** LGT PAD Pad. or LGTTPAD Pad. or LGTBPAD Pad. or LGTWPAD Pad. | 41(29)** LGTIDLE Idle. or LGTWE OB1 Idle. | 42(2A)** LGT SPEC (Reserved). or LGTWE OB2 EOB sequence. | 43(2B)** LGT PRE Prefix. or LGTTENQ ENQ. or LGTWE OB3 ENQ. |

**Displacement will be four bytes less if type 1 scanner is not present.

| | | | |
|----------------------------------|---------------------------------|---|---|
| 44(2C)** LGTCIRN NAK. | 45(2D)** LGTRES Restore. | 46(2E)** LGTRSTP Reader stop. | 47(2F)** LGTETB1 Circle B. |
| or LGTWEQB4 NAK. | or LGTWEOT1 EOT1. | or LGTTXOFF XOFF control character. | or LGTCIRB1 Circle B. |
| | | or LGTWEOT2 EOT2. | or LGTCIRB Circle B. |
| | | | or LGTTXON XON control charac- ter. |
| | | | or LGTWEOT3 EOT3. |
| 48(30)** LGTCIRY Circle Y. | 49(31)** LGTBYB Bypass. | 50(32)** (Reserved). | 51(33)** LGTPF Punch off. |
| or LGTWECT4 EOT4. | | | |
| 52(34)** LGTPON Punch on. | 53(35)** LGTDELET Delete. | 54(36)** LGTESLSH Slash. | 55(37)** LGTESPCE Space. |

**Displacement will be four bytes less if type 1 scanner is not present.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---------------------------|------------|---|
| 0(0) | | LGTTYPE | Terminal type identification. |
| | X'00' | | 2741. |
| | X'02' | | 2740 Basic. |
| | X'04' | | 2740 Station Control. |
| | X'06' | | 2740 Transmit Control. |
| | X'08' | | 2740 Station Control with checking. |
| | X'0A' | | 2740 Transmit Control with checking. |
| | X'0C' | | 2740 with checking. |
| | X'0E' | | 2740 Model 2 with checking. |
| | X'14' | | 2740 Model 2 without checking. |
| | X'1C' | | 1050. |
| | X'1D' | | MTA. |
| | X'20' | | TTYI-B (83B3). |
| | X'22' | | TTYII. |
| | X'24' | | TTY World Trade. |
| | X'26' | | TTYI-A (115A). |
| | X'4A' | | BSC EBCDIC point-to-point station. |
| | X'4C' | | BSC EBCDIC control station. |
| | X'4E' | | BSC EBCDIC tributary station. |
| | X'6A' | | BSC ASCII point-to-point station. |
| | X'6C' | | BSC ASCII control station. |
| | X'6E' | | BSC ASCII tributary station. |

LOGICAL LINE GROUP CONTROL TABLE**LLG****Size in bytes:** 12(C) plus 4 bytes for each line in the line group.**Created by:** NCP generation.**Pointer to LLG:** RVTRP field in RVT.**Function:** Consists of a line scan parameter area, plus one pointer to the LCB for each line in the line list.

| | | | |
|--|--|---|--|
| 0(0) | | LLGBCUP Pointer to current group (last 18 bits). | |
| LLGFLAGS* Logical line group flags. | | | |
| 4(4) | | LLGNOL Number of lines in group. | 6(6) LLGLTG Number of lines to go. |
| 8(8) | | LLGOSET Current offset into line table. | |
| 12(C) | | LLGPTR Pointer to the LCB for the first line in this group. Pointers to subsequent lines in the group follow this field. If this is the system LLG (LLG flags, bit 0 on), this field is set to zero and no other pointers follow it. | |

*Indicates a byte expansion follows.

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|-----------------------------------|------------|---|
| 0(0) | 1...1...1... .. | LLGFLAGS | Logical line group flags. This is the LLG for the system. LLG in use. At least one line requires waiting before group operation complete. (Bits 3-7 reserved) |

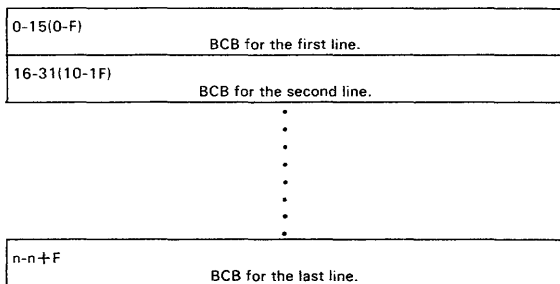
Size in bytes: 16(10) for each line

Located: Starts at storage location X'800'.

Created by: NCP and EP generation.

Referenced by: Level 2 routines.

Function: Allows the level 2 routines to find a line's CCB when only the line address is known.



LINE VECTOR TABLE (for Type 2 scanner)

**LNVT
(Type 2)**

Size in bytes: Variable, depending on number and type of communication scanners attached and on the highest line interface address specified.

Located: Starts at storage location X'840'.

Created by: NCP and EP generation.

Referenced by: EP and NCP level 2 routines.

Function: Allows the level 2 routines to find a line's CCB when only the line address is known.

| | |
|--|---|
| 0(0) Address pointer to corresponding CCB. | 2-n Two bytes for each line interface address. |
|--|---|

LINE TRACE CONTROL BLOCK

LTCB

Size in bytes: 32(20)

Created by: NCP generation.

Pointer to LTCB: SYSLTBP field in HWE. The LTCB is located 36(24) bytes beyond this address.

Function: Contains the pertinent parameters for the line trace function.

| | | |
|---|--|--|
| 0(0) CCTL2 Address of normal level 2 character service routine when trace first started on this line. | 2(2) CCTSTATE References the pseudo state address table used to invoke line trace. | |
| 4(4) CCTACB Pointer to the ACB for the line being traced. | 6(6) CCTCUT Buffer limit per line trace control block. | 7(7) CCTMAXBF Maximum number of buffers that can be transferred across the channel with one host Read. |
| 8(8) CCTSAVE Save area for link address. | 10(A) CCTTIME Timer control field for line trace. | |
| | CCTTMOUT Interval timer field for line trace. | 11(B) CCTTENTH Tenth second timer started when trace began. |
| 12(C) CCTBCB Address of vector to this line's ACB. | 14(E) CCTCHAR Count of the number of buffer locations remaining in the current buffer. | |
| 16(10) CCTHDBUF Pointer to first buffer in current chain (last 18 bits). | | |
| CCTBFMAX Maximum number of buffers to be filled before transferring diagnostic units to host. | | |
| 20(14) CCTITIME Initial value of interval timer field for line trace. | 22(16) CCTEPBAR BAR for EP line. (NCP/VS) | |

| | |
|--|--|
| 24(18) | <p style="text-align: center;">CCTDATA</p> <p style="text-align: center;">Address of next diagnostic unit to be stored (last 18 bits).</p> |
| <p>CCTBFSZD</p> <p>Number of bytes in full trace buffer.</p> | |
| 28(1C) | <p style="text-align: center;">CCTSTART</p> <p style="text-align: center;">Pointer to beginning of current buffer (last 18 bits).</p> |

Size in bytes: 34(22)

Created by: NCP generation.

Pointer to LTS: Located at CXTLTS in CXSGMISC.

Function: Contains control information for panel test operations.

| | | | |
|---|---|---|--|
| 0(0) LTSC* Control byte. | 1(1) LTSPDSYN PAD or SYN character for this line. | 2(2) LTSMDSF The system gen- erated Set Mode SDF. | 3(3) LTSXTPCF The system generat- ed LCD value. |
| 4(4) LTSLNAD The line address of the line being tested. | | 6(6) LTSSVL2 The saved CCBL2 for the line being tested. | |
| 8(8) LTSDIALL Buffer for non X'FF' receive data characters or autocall dial digits. (16 bytes) | | | |
| 24(18) DLIMETER Counter for non X'FF' data charac- ters when receiving. | | 26(1A) DIGCNTR Counter for autocall dial digits and receive data characters. | |
| 28(1C) LTSACLN Autocall line address. | | 30(1E) LTSL2 Address of entry point for level 2 interrupt. | |
| 32(20) LTSSVL3 Saved level 3 address used in a dial operation. | | 34(22) ALLONES Constant of all ones. | |

*Indicates a byte expansion follows.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|------------|--|
| 0(0) | 1...1...1...1...1 | LTSC*TL | Control field. Line is initialized. 1 = full duplex 0 = half duplex Autocall line. Monitor-ring-indicator is installed. Emulation line. |

Size in bytes: Variable, depending upon the number of entries.

Created by: NCP generation.

Pointer: Located at CXTNRT in SLVL5.

Function: Contains routing information for each of the remote communications controllers in the network.

| | |
|----------------------------------|---|
| 0(0) | NRTCBPTR Pointer to the node's DVB (last 18 bits). |
| NRTFLAGS* Node routing flags. | |

*Indicates a byte expansion follows.

Byte Expansion

| Offset | Bit Pattern | Field Name | Contents |
|--------|--|------------|---|
| 0(0) | 1... .. .1...1...1...1...1.. | NRTFLAGS | Node routing flags. Invalid node. Node is not this NCP. IPL lock on. Not first level. Level 5 task required. Channel not connected. Bits 6-13 are reserved. Bits 14 and 15 are part of the address field. |

Size in bytes: 37(25)

Located in: Dynamically allocated buffer.

Created: When a BTU Test command is received.

Pointer to OLTT: DVBSDRT field in DVB when in online test mode.

Function: Contains status flags and counters from diagnostic I/O operations.

| | | | | | | | | | | | | | | | |
|--|--|--|---------------------|--|--|---|--|-----------------------|--|---|--|--|--|--|--|
| 0(0) | | | OLTCTRS Counters | | | | | | | | | | | | |
| 8(8) | | | | | | OLTFLGS Flags. (This field can also be used for counters.) | | | | | | | | | |
| 16(10) OLTSTAT Status field (same as IOBSTAT). | | | | 18(12) OLTEXST Extended status field (same as IOBEXTST). | | | | 19(13) (Reserved). | | | | | | | |
| 20(14) OLTPHER Phase error-converted. | | 21(15) OLTFSTS First status - converted. | | 22(16) OLTFNLS Final status - converted. | | | | | | | | | | | |
| 24(18) OLTCCMAD Current relative command address. | | | | 26(1A) OLTTEMP Temporary halfword work area. | | | | | | | | | | | |
| 28(1C) OLTFBAD Address of first BCU buffer. (Shifted address) | | | | 30(1E) OLTLCBAD LCB address. (Shifted address) | | | | | | | | | | | |
| 32(20) | | | | | | | | | | OLTCBAD Current command buffer address (last 18 bits). | | | | | |
| ----- OLTCBOF Offset into current buffer. | | | | | | | | | | | | | | | |
| 36(24) OLTXFER Maximum buffers in Read sub-block. | | | | | | | | | | | | | | | |

Size in bytes: 24(18)

Created by: NCP generation.

Pointer to PCB: SYSPDBP field in HWE.

Function: Provides an area through which information is passed between modules supporting control panel operation.

Notes: This control block is required to be tailored for a specific machine. It requires the following information:

- Type of channel adapter installed.
- Type of communication scanner installed.
- If the type of scanner is type 2, which ones are installed.

The channel adapter and communication scanner type information is used to generate the invalid external register address ranges for input. This information is used to verify external register addresses entered into the dynamic register display and address trace routines in order to avoid input/output instruction checks.

The indicators of which type 2 scanners are installed are used to validate the ICW interface address entered into the ICW display routines. Any attempt to communicate with a nonexistent scanner results in a machine check.

The invalid external register ranges follow the PCB in storage.

| | | | |
|--|--|--|--|
| 0(0) | | | |
| PCBADSW Value of the ADDRESS/DATA switches (last 18 bits). | | | |
| PCBCTL Control byte; used as inter- face with level 3 panel service module. | | | |
| 4(4) | PCBFNSW Value of the DISPLAY/FUNCTION SELECT switch. | 6(6) PCBD1CTL Display 1 con- trol byte. | 7(7) PCBD2CTL Display 2 control byte. |
| 8(8) | | | |
| PCBD1AD Display 1 address (last 18 bits). | | | |
| PCBFUNCE Function exten- sion control byte. | | | |

| | |
|--|--|
| 12(C) <div>PCBD2AD</div> <div>Display 2 address (last 18 bits).</div> <div> <div>PCBAPNSL</div> <div>Display append- age select byte.</div> </div> | |
| 16(10) <div>PCBICPAD</div> <div>Panel request intercept address. (Always shifted regardless of storage size.)</div> | 18(12) <div>PCBICWD</div> <div>Current ICW address with bit 38 on.</div> |
| 20(14) <div>PCBICWN</div> <div>New ICW address - request for data set lead display.</div> | 22(16) <div>(Reserved).</div> |

PCF STATE VECTOR TABLE
(Type 1 Scanner only)

PCF

Size in bytes: 112

Located in: Module CYASVC, but moved to highest 128 bytes of storage at load time.

Created by: NCP and EP generation.

Referenced by: LCP

Function: Provides address pointers to bit service routines.

Start/Stop

| | |
|--|--|
| 0(0) Address pointer to PCF 0 - No-op (NOOP). | 2(2) Address pointer to PCF 1 - Set Mode (CXBMPCF1). |
| 4(4) Address pointer to PCF 2 - Monitor DSR (BPCF2). | 6(6) Address pointer to PCF 3 - Monitor RI/DSR (BPCF3). |
| 8(8) Address pointer to Monitor Phase (BPCF45). | 10(A) Address pointer to Monitor Phase (BPCF45). |
| 12(C) Undefined for start-stop (NOOP) | 14(E) Address pointer to PCF 7 - Receive (SSRCVSRT). |
| 16(10) Address pointer to PCF 8 - Transmit Initial (CXBSPCF8). | 18(12) Address pointer to PCF 9 - Transmit Normal (XSSTART). |
| 20(14) Address pointer to PCF A - Transmit Break (CXBSPCFA). | 22(16) Address pointer to PCF B - Prepare to turn (CXBSPCFB). |
| 24(18) Address pointer to PCF C - Transmit Turn, RTS Off (CXBSPCF C). | 26(1A) Address pointer to PCF D - Transmit Turn, RTS on (CXBSPCFD). |
| 28(1C) Undefined for start-stop (NOOP). | 30(1E) Address pointer to PCF F - Disable (CXBMPCFF). |

Binary Synchronous

| | |
|---|--|
| 32(20) Address pointer to PCF 0 - No-op (NOOP). | 34(22) Address pointer to PCF 1 - Set Mode (CXBMPCF1). |
| 36(24) Address pointer to PCF 2 - Monitor DSR (BPCF2). | 38(26) Address pointer to PCF 3 - Monitor RI/DSR (BPCF3). |

| | |
|--|---|
| 40(28) Address pointer to PCF 4 - Monitor Phase, DSR Check Off (BPCF45). | 42(2A) Address pointer to PCF 5 - Monitor Phase, DSR Check on (BPCF45). |
| 44(2C) Undefined (NOOP). | 46(2E) Address pointer to PCF 7 - Receive (RCVDATA). |
| 48(30) Address pointer to PCF 8 - Trans- mit Initial (BPCF8). | 50(32) Address pointer to PCF 9 - Transmit Normal (XMITDATA). |
| 52(34) Address pointer to PCF A - Trans- mit New Sync (BPCFA). | 54(36) Undefined (NOOP). |
| 56(38) Address pointer to PCF C - Trans- mit Turn, RTS Off (CXBSPCF8). | 58(3A) Address pointer to PCF D - Transmit Turn, RTS On (CXBSPCFD). |
| 60(3C) Undefined (NOOP). | 62(3E) Address pointer to PCF F - Disable (CXBMPCFE). |

Dial

| | |
|---|---|
| 64(40) Address pointer to PCF 0 - No-op (NOOP). | 66(42) PCF 1 undefined for Dial (NOOP). |
| 68(44) PCF 2 undefined for Dial (NOOP). | 70(46) PCF 3 undefined for Dial (NOOP). |
| 72(48) Address pointer to PCF 4 - Monitor Call Unit (PCFDIAL4). | 74(4A) Address pointer to PCF 5 - Monitor Call Unit (PCFDIAL5). |
| 76(4C) PCF 6 undefined for Dial (NOOP). | 78(4E) PCF 7 undefined for Dial (NOOP). |
| 80(50) Address pointer to PCF 8 - Digit Valid (PCFDIAL8). | 82(52) PCF 9 undefined for Dial (NOOP). |
| 84(54) PCF A undefined for Dial (NOOP). | 86(56) PCF B undefined for Dial (NOOP). |
| 88(58) PCF C undefined for Dial (NOOP). | 90(5A) PCF D undefined for Dial (NOOP). |
| 92(5C) PCF E undefined for Dial (NOOP). | 94(5E) Address pointer to PCF F - Disable (CXBMPCFE). |

Feedback Check

| |
|--|
| 96-111(60-6F) Feedback check PCFs are No-op (NOOP). |
|--|

QUEUE CONTROL BLOCK**QCB
(EP)****Size in bytes:** 34**Located:** Starts at storage location X'708'.**Created by:** EP generation.**Updated by:** LCP, ICP.**Referenced by:** LCP, ICP.**Function:** Provides a pointer to the first and last CCBs on all queues.

| | |
|--|---|
| 0(0) TMRP Pointer to next CCB checked for time-out. | 2(2) IPL save registers. |
| 4(4) | |
| 8(8) QCBF* QCB flags and active line count. | 10(A) QCBT Active command counter QCB table. |
| 12(C) PDSOF Address pointer to the first CCB in the priority data service out queue. | 14(E) PDSOL Address pointer to the last CCB in the priority data service out queue. |
| 16(10) DSOF Address pointer to the first CCB in the data service out queue. | 18(12) DSOL Address pointer to the last CCB on the data service out queue. |
| 20(14) DSIF Address pointer to the first CCB in the data service in queue. | 22(16) DSIL Address pointer to the last CCB in the data service in queue. |
| 24(18) SOF Address pointer to the first CCB in the status out queue. | 26(1A) SOL Address pointer to the last CCB in the status out queue. |
| 28(1C) SNOF Address pointer to the first CCB in the sense out queue. | 30(1E) SNOL Address pointer to the last CCB in the sense out queue. |
| 32(20) SSF Address pointer to the first CCB in the stacked status queue. | 34(22) SSL Address pointer to the last CCB in the stacked status queue. |
| 36(24) CSPQ1 Address pointer to the first character serviced (type 1 scanner). | 38(26) CSPQ2 Address pointer to the last character serviced (type 1 scanner). |
| 40(28) SVC0 | |

*Indicates a byte expansion follows.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|------------|---|
| 0(0) | 1... .. .1..1.1 1... | QCBF | QCB flags. Set suppress out down. Set stacked status service. Set sense service. Set TIO sequence. Set single byte mode. |

QUEUE CONTROL BLOCK FOR INPUT QUEUES**QCB
(Input)**

Size in bytes: 16(10) when no BHRs are defined; 20(14) when BHRs are defined.

Created by: NCP generation.

Pointer to QCB: Variable.

Function: Controls input queues.

Note: This is the general format for all input queues. The XYZ identifier at the beginning of each label is replaced with a different three letter identifier for each particular input queue.

| | | |
|---|---|---|
| 0(0) XYZ1ECB Pointer to first element queued. (Shifted address) | | 2(2) XYZLECB Pointer to last element queued. (Shifted address) |
| 4(4) XYZSTAT* Task and queue status. | 5(5) XYZPRKEY* QCB ID flag and task protect key. | 6(6) XYZLINK Pointer to next QCB on the queue. (Shifted address) |
| 8(8) XYZISKEP Task entry point (last 18 bits). | | |
| XYZMCBD Major control block displacement. | 9(9) XYZSCHD* Task dispatching priority. | |
| 12(C) XYZSAVE Address of save area push-down list. (Shifted address) | | 14(E) XYZLUNK Pointer to previous QCB on the queue. (Shifted address) |
| 16(10) XYZBHSET BH set (or BHR) address (last 18 bits). This field included only when BHRs are defined. | | |
| XYZBHRST* BHR status bit. | 17(11) XYZBHSC* BHR scheduling bits. | |

*Indicates a byte expansion follows.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|------------|--|
| 4(4) | 1... .. .1..1.1 1...1..1.1 | XYZSTAT | Task and queue status. Task in pending state (triggered). (Reserved) Delayed task pending bit (task is triggered while active). Task is not in ready state. Task is reentrant. BHR extension definition: task can execute BHRs. (Reserved). Element has been dequeued (and not returned to the queue) during execution of active task. |
| 5(5) | 1010 1...xxx | XYZPRKEY | QCB ID flag and task protect key. Indicates that this is a pseudo-input or input QCB. Protection key. |
| 9(9) | 100. 010. 001. 000. | XYZSCHED | Task dispatching priority. Task priority is productive. Task priority is immediate. Task priority is appendage. Task priority is nonproductive. (Bits 3-7 reserved). |
| 16(10) | 10.. 01.. 11..1.1 1... | XYZBHRST | BHR status bits. Point 2 execution. Point 1 execution. Point 3 execution. First time BHR controller called. BHR sequence aborted. (Reserved). BHR protect key. |
| 17(11) | 1... .. .1..1.1 1...1.. | XYZBHSCH | BHR scheduling bits. BHR scheduled for READ command. BHR scheduled for INVITE command. BHR scheduled for WRITE command. (Reserved). (Reserved). BHR scheduled after I/O. |

QUEUE CONTROL BLOCK FOR WORK QUEUES

**QCB
(work)**

Size in bytes: 8(8)

Created by: NCP generation.

Pointer to QCB: Variable.

Function: Control work queues.

Note: This is the general format for all work queues. The SWQ identifier at the beginning of each label is replaced with a different three letter identifier for each particular work queue.

| | | |
|--|---|---|
| 0(0) SWQ1ECB Pointer to first element queued. (Shifted address) | | 2(2) SWOLECB Pointer to last element queued. (Shifted address) |
| 4(4) SWQSTAT* Task and queue status. | 5(5) SWQPRKEY* QCB ID flag and task protect key. | 6(6) SWQLINK Pointer to the next QCB on the queue. (Shifted address) |

*Indicates a byte expansion follows.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|-------------|--|------------------------|--|
| <p>4(4)</p> | <p>1... ..</p> <p>.1.. ..</p> <p>..1. ...</p> <p>...1</p> <p>.... 1...</p> <p>.... .1..</p> <p>.... ..1.</p> <p>.... ...1</p> | <p>SWQSTAT</p> | <p>Task and queue status.</p> <p>Task in pending state (triggered). (Reserved)</p> <p>Delayed task pending bit (task is triggered while active.)</p> <p>Task is not in ready state. Task is reentrant.</p> <p>BHR extension definition: task can execute BHRs. (Reserved).</p> <p>Element has been dequeued (and not returned to the queue) during execution of active task.</p> |
| <p>5(5)</p> | <p>1010 0...</p> <p>.... .xxx</p> | <p>SWQPRKEY</p> | <p>QCB ID flag and task protect key.</p> <p>Indicates that this is a work QCB.</p> <p>Protect Key.</p> |

Size in bytes: Variable depending upon numbers of entries.

Created by: NCP generation.

Pointer to RVT: SYSRVTAD field in word direct addressable storage (XDA), location X'07E8'.

Function: Serves as the master directory to level 5 resource control blocks. Each entry contains a type field plus the address of the resource control block for that resource.

Immediately preceding the first entry is a halfword that contains the highest ID allowed. Entry 0 is reserved for this communications controller. Format of entries is as follows.

| | |
|------------------------------------|--|
| 0(0) RVTTYPE* Resource type. | 1(1) RVTRP Pointer to resource control block. The resource control block can be a line control block, logical line group table, or device control block, depending upon the resource type. |
|------------------------------------|--|

*Indicates a byte expansion follows.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---------------------------|------------|--------------------------------|
| 0(0) | 0000 0000 | RVTTYPE | Resource type. |
| | 100. | | The communications controller. |
| | 010. | | Line. |
| | 001. | | Device. |
| | ...1 | | Line group. |
| | 1... | | Input. |
| | 10. | | Output. |
| | 11. | | Switched call-in. |
| | 1 | | Switched call-out. |
| | | | Device-dependent. |

Size in bytes: 4(4) or 8(8)

Located in: Switched line group table (SGT), one SGE for each line in the group.

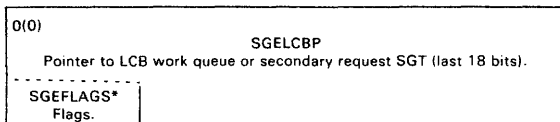
Created by: NCP generation.

Pointer to SGE: None. (See SGT.)

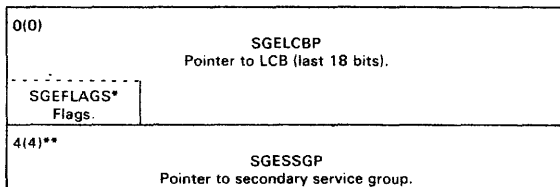
Function: Points to a line control block (LCB) or another SGT for chaining.

The following format is for:

- First entry if there is no secondary request group. (See SGT for secondary request group.)
- Each entry after first.
- Last entry if there is no secondary service group.



The following format is for last entry if there is a secondary service group.



*Indicates a byte expansion follows.

**Actual position depends upon number of entries in table.

| Offset | Bit Pattern | Field Name | Contents |
|--------|-------------|------------|--|
| 0(0) | | SGEFLAGS | Flags |
| | 1... .. | | Queue is present (always 1). |
| | .1... .. | | (Reserved) |
| | ..1... .. | | Not line entry. |
| | ...1... .. | | Secondary request entry. |
| |1... .. | | Last line entry. |
| |1.. | | Secondary service group entry is next. |
| |1. | | (Reserved). |
| |1 | | (Reserved). |

SWITCHED LINE GROUP TABLE

SGT

Size: QCB, counter, and first entry for secondary request group = 20(14) bytes.

Created by: NCP generation.

Pointer to SGT: COESGTP field in COE; LCBESGTP field in LCB.

Function: The SGT is a group of similar type switched lines that can be used to call a terminal that uses that group.

Switched Group QCB (SGTORQ)
(See QCB for Work Queues for all bit definitions.)

| | | |
|---|--|--|
| 0(0) SGT1ECB Pointer to first element queued. (Shifted address) | | 2(2) SGTLECB Pointer to last element queued. (Shifted address) |
| 4(4) SGTSTAT Task and queue status. | 5(5) SGTPRKEY Protection key. | 6(6) SGTLINK Pointer to next QCB in queue. (Shifted address) |

| | | | |
|---|--|--------------------------------|-----------------------------------|
| 8(8) SGTWLL Work load limit. | 9(9) SGTWLC Work load cur- rent size. | 10(A) SGTQL Queue limit. | 11(B) SGTCIL Call in limit. |
| 12(C) SGTCIC Call in counter. | 13(D) Pad | | |
| 16(10) SGT1E Address of secondary request group SGT (last 18 bits). | | | |
| ----- SGTFLAG* Flags. | | | |

*Indicates a byte expansion follows.

Byte Expansions

| Offset | Bit Pattern | Field Name | Contents |
|--------|---|------------|---|
| 16(10) | 1...1...1...1... 1...1..1..1 | SGTFLAG | Flags. Queue is present (always 1). (Reserved). Not line entry. Secondary request group. Last line entry. Secondary service group entry is next. (Reserved). (Reserved). |

SEND ID**SID**

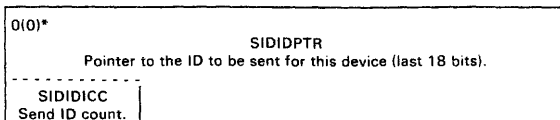
Size in bytes: 4(4)

Located in: DVB.

Created by: NCP generation.

Pointer to SID: None; SID follows COE if send ID is required.

Function: Contains information required for sending hardware identification. Extension is included only for BSC switched terminals that require the 3705 to send its ID.



***Note:** Actual position depends on other extensions present. This extension is present only if the call-out extension (COE) is present, and always follows that extension.

Size in bytes: 4 bytes in header; 4 bytes in each entry; 4 bytes in trailer.

Created by: NCP generation.

Pointer to SOT: LCBESOTP field in LCB.

Function: Defines the order in which devices on a line are interrogated to see if that device requires service. Generated for multipoint lines.

Header

| | | |
|---|---|-------------------------|
| 0(0) SOTEMAX Maximum number of entries. | 1(1) SOTUSE Number of entries in use. | 2(2) (Reserved). |
|---|---|-------------------------|

Entry Format

| |
|---|
| 4(4) SOTRESP Pointer to the DVBSTAT field in the device control block (DVB) for this device. More than one entry can point to the same DVB. |
|---|

Trailer

| | |
|---|-------------------|
| * Negative offset to first entry in SOT. | * Set to zero. |
|---|-------------------|

*Offset depends on the number of entries in the SOT.

TRANSLATE/DECODE TABLE

TDT

Size in bytes: 128

Located in: Module CYASL

Created by: NCP and EP generation.

Referenced by: Type 1 or 2 scanner (start-stop terminals only).

Function: Assists in the inversion of the data byte received from or transmitted to the host. The TDT allows the inversion to be accomplished by table look-up rather than by shifting bits.

0-127(0-7F)

XMTABLE
Translation data.

TIME AND DATE CONTROL BLOCK

TND

Size in bytes: 21(15)

Created by: NCP generation.

Pointer to TND: SYSEBCP field in HWE.

Function: Keeps track of current time and date.

| | |
|--------|--|
| 0(0) | <p style="text-align: center;">TNDMDY</p> <p style="text-align: center;">Date in the form mm/dd/yy.* (length of 8 bytes)</p> |
| 6(6) | <p style="text-align: center;">TNDYDOY</p> <p style="text-align: center;">Julian date in the form yy.ddd.* (The yy part of this field overlaps the yy part of the previous field.)</p> |
| 12(C) | <p style="text-align: center;">TNDHMS</p> <p style="text-align: center;">Time in the form hh.mm.ss.**</p> |
| 20(14) | <p style="text-align: center;">TNDUSKIP</p> <p>Inhibit or allow update of TND.</p> <p>Zero = inhibit</p> <p>Nonzero = allow update</p> |

* m = month
d = day
y = year

** h = hour
m = minute
s = second

EP TRACE TABLE

EP TRACE TABLE

Size in bytes: 32 for each entry.

Located: Immediately following the trace table pointer.

Created by: Trace routine (CYATRC).

Function: Provides line and channel trace for selected subchannel addresses. One entry is made for each level 2 line interrupt, and each level 3 channel data/status and initial selection interrupt.

Level 2 Trace Entry

| | | | |
|---|--|--|--|
| 0(0) ICW1HW SCF and PDF of line being traced (Input X'44'). | | 2(2) ICW2HW LCD, PCF, and SDF of line being traced (Input X'45'). | |
| 4(4) DISPLAY* Contents of type 2 scanner display register. | | 6(6) ICW3HW ICW bits 32-45 (Input X'47'). | |
| 8(8) DBUFF0A First and second bytes of first CCB buffer (CCBDATA). | | 10(A) DBUFF0B Third and fourth bytes of first CCB buffer (CCBDATA). | |
| 12(C) DBUFF1A First and second bytes of second CCB buffer (CCBDATA1). | | 14(E) DBUFF1B Third and fourth bytes of second CCB buffer (CCBDATA1). | |
| 16(10) IDCMD X'FF' (Identifies this as a level 2 line trace entry.) | 17(11) Subchannel ad- dress of line be- ing traced. | 18(12) STATSEN CCB current status and sense (CCBCSTAT/CCBCSENS) OR'ed with final status and sense (CCBSTAT/CCBSENSE). | |
| 20(14) CMDLRI Command byte for this CCB (CCBCMD). | 21(15) Line request in- formation (CCBLRI). | 22(16) CACSVSTC CCB character address counter (CCBCAC). | 23(17) CCB service/status flag (CCBSVSTC). |
| 24(18) CLOCK CCB timer count field (CCBCLOCK). | 25(19) Displacement into time-out branch table (CCBTMADR). | 26(1A) LVL2ADR CCB address of the routine entered for this level 2 interrupt (CCBL2). | |

*Valid only for the last subchannel that had its data interface displayed.

| | |
|---|--|
| 28(1C) LRCSSC (SS) LRC byte (CCBLRC) | 30(1E) CCBADDR Address of the CCB. |
| FLAGB1B2 (BSC) CCB flag bytes 1 and 2 (CCBFLGB1 and CCBFLGB2) | |

Level 3 Data/Status Trace Entry

| | | | |
|---|--|---|--|
| 0(0) DATASTAT Contents of Type 1 CA data/status control register (Input X'62'). | | 2(2) ADRSTAT I/O device address and ESC status byte (Input X'63'). | |
| 4(4) DATAB1B2 First and second data bytes (Input X'64') or X'FFFF' if this is a status interrupt. | | 6(6) DATAB3B4 Third and fourth data bytes (Input X'65') or X'FFFF' if this is a status interrupt. | |
| 8(8) QCBFLGS QCB flag byte (QCBF). | 9(9) Active command counter (byte 9 of the QCB). | 10(A)** SEROQS Subchannel address for first CCB on PDSO queue (CCBSUBCH). | 11(B)** Subchannel address for first CCB on DSO queue (CCBSUBCH). |
| 12(C) ** DSISO Subchannel address for first CCB on DSI queue (CCBSUBCH). | 13(D) ** Subchannel address for first CCB on SO queue (CCBSUBCH). | 14(E) ** SNOSSQS Subchannel address for first CCB on SNO queue (CCBSUBCH). | 15(F) ** Subchannel address for first CCB on SS queue (CCBSUBCH). |
| 16(10) IDCMD Second byte of adapter requests, group 2 (Input X'77'). | 17(11) Subchannel address of CCB causing interrupt. | Bytes 18(12) through 31 (1F) are identical to the Level 2 Trace Entry. | |

** If there is no CCB on the queue, the byte contains zeros.

Level 3 Initial Select Trace Entry

| | | | |
|---|---|--|--|
| 0(0) INITSEL Contents of initial select control register (Input X'60'). | | 2(2) ADRCMD CCB subchannel address and channel I/O command byte for the line being traced (Input X'61'). | |
| 4(4) DATAB1B2 X'AAAA' (Identifies this entry as an initial select interrupt trace entry.) | | 6(6) DATAB3B4 X'AAAA' (Identifies this entry as an initial select interrupt trace entry.) | |
| 8(8) QCBFLGS QCB flag byte (QCBF). | 9(9) Active command counter (Byte 9 of the QCB). | 10(A) ** SEROQS Subchannel address for first CCB on PDSO queue (CCBSUBCH). | 11(B) ** Subchannel address for first CCB on DSO queue (CCBSUBCH). |
| 12(C) ** DSISO Subchannel address for first CCB on DSI queue (CCBSUBCH). | 13(D) ** Subchannel address for first CCB on SO queue (CCBSUBCH). | 14(E) ** SNOSSQS Subchannel address for first CCB on SNO queue (CCBSUBCH). | 15(F) ** Subchannel address for first CCB on SS queue (CCBSUBCH). |
| 16(10) IDCMD Second byte of adapter requests, group 2 (Input X'77'). | 17(11) Subchannel address of CCB causing interrupt. | Bytes 18(12) through 31(1F) are identical to the Level 2 Trace Entry. | |

** If there is no CCB on the queue, the byte contains zeros.

TIME VALUE SELECT TABLE

TVS

Size in bytes: 64(40)

Created by: NCP generation.

Pointer to TVS: SYSTVSP field in HWE.

Function: Contains fixed and optional time-out values. This table must be at a 256-byte boundary.

| | |
|---|---|
| 0(0) TVSHI0 Fixed (Idle/RAS). | 2(2) TVSHI1 Fixed (0 seconds). |
| 4(4) TVSHI2 Fixed (1 second). | 6(6) TVSHI3 Fixed (2.2 seconds). |
| 8(8) TVSHI4 Fixed (3 seconds). | 10(A) TVSHI5 Fixed (23.5 seconds). |
| 12(C) TVSHI6 Fixed (60 seconds). | 14(E) TVSHI7 Variable.* |
| 16(10) TVSHI8 Variable.* | 18(12) TVSHI9 Variable.* |
| 20(14) TVSHIA Variable.* | 22(16) TVSHIB Variable.* |
| 24(18) TVSHIC Variable.* | 26(1A) TVSHID Variable.* |
| 28(1C) TVSHIE Variable.* | 30(1E) TVSHIF Variable.* |
| 32(20) TVSLO0 Fixed (Idle/RAS). | 34(22) TVSLO1 Fixed (0 seconds). |
| 36(24) TVSLO2 Fixed (1 second). | 38(26) TVSLO3 Fixed (2.0 seconds). |
| 40(28) TVSLO4 Fixed (3 seconds). | 42(2A) TVSLO5 Fixed (23.5 seconds). |
| 44(2C) TVSLO6 Fixed (60 seconds). | 46(2E) TVSLO7 Variable.* |
| 48(30) TVSLO8 Variable.* | 50(32) TVSLO9 Variable.* |

*Values determined at NCP generation.

| | | | |
|--------|----------------------|--------|----------------------|
| 52(34) | TVSLOA Variable.* | 54(36) | TVSLOB Variable.* |
| 56(38) | TVSLOC Variable.* | 58(3A) | TVSLOD Variable.* |
| 60(3C) | TVSLOE Variable.* | 62(3E) | TVSLOF Variable.* |

*Values determined at NCP generation.

USASCII CHARACTER DECODE DISPLACEMENT TABLE

Size in bytes: 32

Located in: Module CYABL

Created by: NCP and EP generation.

Referenced by: PARTYCK, ASCXMT.

Function: Provides offset in branch table for proper control character processing.

0-31(0-1F)

ASCRCVBT
Displacement data.

WU TRANSLATE TABLE

**WU
XLATE
TABLE**

Size in bytes: 64

Located in: Routine CYAL3H of module CYANUC

Created by: EP generation

Referenced by: Data service routines (for start-stop terminals only).

Function: Assists in translating WU code.

0-63(0-3F)

CYAXTL02
Translation data.

Size in bytes: 128(80)

Located in: Controller storage beginning at location X'0780'.

Created by: NCP generation.

Pointer to XDA: None. Fixed location.

Function: Contains frequently accessed system control fields.

ROS Contained Code Save Area Sub-Block (XDAROS)

| | |
|---------|--|
| '0780'* | ROSW1 (ROSSVIAR) Save area for program levels 1/2 IAR. |
| '0784'* | ROSW2 (ROSSVR1) Save area for program levels 1/2 register 1. |
| '0788'* | ROSW3 (ROSSVR2) Save area for program levels 1/2 register 2. |
| '078C'* | ROSW4 (ROSSVR3) Save area for program levels 1/2 register 3. |
| '0790'* | ROSW5 (ROSSVR4) Save area for program levels 1/2 register 4. |
| '0794'* | ROSW6 (ROSSVR5) Save area for program levels 1/2 register 5. |
| '0798'* | ROSW7 (ROSSVR6) Save area for program levels 1/2 register 6. |
| '079C'* | ROSW8 (ROSSVR7) Save area for program levels 1/2 register 7. |

*Absolute storage location in hex.

Router Sub-Control Block (XDARTR)

| | |
|---------|--|
| '07A0'* | RTRW1 (RTRSVR1) Save area for program level 2 register 1. |
| '07A4'* | RTRW2 (RTRSVR2) Save area for program level 2 register 2. |
| '07A8'* | RTRW3 (RTRSVR3) Save area for program level 2 register 3. |
| '07AC'* | RTRW4 (RTRSVR4) Save area for program level 2 register 4. |
| '07B0'* | RTRW5 (RTRSVR5) Save area for program level 2 register 5. |
| '07B4'* | RTRW6 (RTRSVR6) Save area for program level 2 register 6. |
| '07B8'* | RTRW7 (RTRSVR7) Save area for program level 2 register 7. |
| '07BC'* | RTRW8 (RTRSVLAR) Save area for lagging address register (LAR). |
| '07C0'* | RTRW9 (RTRSVIAR) Save area for program level 2 IAR. |

Supervisor Sub-Control Block (XDASYS)

| | |
|---------|--|
| '07C4'* | SYSW1 (SYSBP1FB) Pointer to first free buffer. |
|---------|--|

*Absolute storage locating in hex.

| | |
|---------|---|
| '07C8'* | <p>SYSW2 (SYSTMQC) Pointer to current time period's time-queue QCB.</p> |
| '07CC'* | <p>SYSW3 (SYSTMQN) Pointer to next time period's time-queue QCB.</p> |
| '07D0'* | <p>SYSW4 (SYSEBPL) Remembrance of the last buffer in buffer pool.</p> |
| '07D4'* | <p>SYSW5 (SYSBUFPL) Remembrance of the first buffer in buffer pool.</p> |
| '07D8'* | <p>SYSW6 (SYSHWE) Pointer to HWE.</p> |
| '07DC'* | <p>SYSW7 (Reserved).</p> |
| '07E0'* | <p>SYSW8 (UTILSTSZ) Address of last byte of storage.</p> |
| '07E4'* | <p>SYSW9 (RTRL2GOI) Level 2 interrupted IAR.</p> |
| '07E8'* | <p>SYSW10 (SYSRVTAD) Pointer to resource vector table.</p> |
| '07EC'* | <p>SYSW11 (Reserved).</p> |
| '07F0'* | <p>SYSW12 Pointer to logical end of system free buffer pool.</p> |
| '07F4'* | <p>SYSW13 (SYSBST) Pointer to BH set table.</p> |
| '07F8'* | <p>SYSW14 Save area for resident dump.</p> |
| '07FC'* | <p>SYSW15 Save area for resident dump.</p> |

*Hex Storage Location

Size in bytes: 128(80)

Located in: Controller storage beginning at location '0680'.

Created by: NCP generation.

Pointer to XDB: None. Fixed location.

Function: Contains frequently accessed system control fields.

| | | |
|--|----------------------------|---|
| '0680'* Wrap-in-progress byte. If byte = X'00', wrap test is in progress. | '0681'* XDBFILL Pad. | '0682'* PEPFLG** PEP flag bits. (NCP/VS) |
|--|----------------------------|---|

RAS Scan-Control Sub-block, XDBRST (This area is unused in NCP/VS)

| | |
|--|--|
| '0683'* RSTB1 (RTRBASP1) Number of lines in each scan of sub-period 1 of CXCCRAST. | '0684'* RSTB2 (RSTWORKB) Number of lines in each scan of current sub- period of CXCCRAST. |
|--|--|

Supervisor Control Block (XDBSYS)

| | | | |
|--|---|---|--|
| '0685'* SYSB1** (SYSMASK) Control byte for dispatcher flags. | '0686'* SYSB2 (SYSBFS) Offset to last byte of buffer. | '0687'* SYSB3 (SYSBFSZD) Buffer size de- cremented by 4 bytes. | '0688'* SYSB4 (SYSIBC) Buffer size de- cremented by 5; used as initial count by communications lines. |
| '0689'* SYSB5** (SYSSMI) Buffer pool and network status. | '068A'* SYSB6** (SYSFLG0) General commu- nication byte. | '068B'* SYSB7** (SYSFLG1) Field used by dump to deter- mine storage load. | '068C'* SYSB8 (SYSAVEK) Number of save areas contained in a buffer. |
| '068D'* SYSB9 (SYSNODE) NCP node ID. | '068E'* SYSB10 (Reserved). | '068F'* SYSB11 (SYSBFSZC) Buffer size de- cremented by 3. | '0690'* SYSB17 (SYSBUFSZ) True buffer size. |

* Absolute storage location in hex.

**Indicates a byte expansion follows.

| | | | |
|---|---|---|--|
| '0691'* SYSB18 (SYSBKLSZ) Maximum number of buffers in BCU. | '0692'* SYSB19** (SYSBFLG2) General communication byte. | '0693'* SYSB20 (Reserved). | '0694'* TIMB10 (Reserved). |
| '0695'* TIMB11 (TIMEZERO) Zero-second communications error time-out request. | '0696'* TIMB12 (TIMEOTXT) User-specified shoulder tap or default to RAS time-out override. | '0697'* SYSB12 (SYSCSB1) Communication scanner-1 scan limit control. | '0698'* SYSB13 (SYSCSB2) Type 2 scanner-2 scan limit control. |
| '0699'* SYSB14 (SYSCSB3) Type 2 scanner-3 scan limit control. | '069A'* SYSB15 (SYSCSB4) Type 2 scanner-4 scan limit control. | '069B'* SYSB16 (SYSCSSC) Type 2 scanner scan substitution control. | |

Timer Sub-Control Block (XDBTIM)

| | | | |
|--|---|---|--|
| '069C'* TIMB1 (TIMTICNT) Count remembrance field. | '069D'* TIMB2 (TIMSICNT) Count remembrance field for system timer. | '069E'* TIMB3 (TIMWKREG) Work register for communication line timer service routine (CXCLINT). | '069F'* TIMB4 (TIMLNCNT) Number of lines to be serviced before checking for higher priority work. |
| '06A0'* TIMB5 (TIMRSRES) Work register. | '06A1'* TIMB6 (TIMDSABL) Communications timer time-out to protect against failure to disconnect. | '06A2'* TIMB7 (TIMENABL) Communications timer time-out to protect against failure to connect. | '06A3'* TIMB8 (TIMDIAL) Communications timer time-out to protect against dial failure. |
| '06A4'* TIMB9 (TIMDIDLY) Communications timer time-out to protect against delay in dial tone. | '06A5'* TIMBA (TIMSWBID) Communications timer time-out to protect against switched line hang-up. | | |

* Absolute storage location in hex.

** Indicates a byte expansion follows.

Router Sub-Control Block (XDBRTR)

| | | | |
|---|---|---|---|
| '06A6'* RTRB1 (RTRSPUR) Retry counter for program level 3 unresolved interrupts. | '06A7'* RTRB2 (RTRSPUR1) Retry counter for program level 1 unresolved interrupts. | '06A8'* RTRB3 (RTRINLVL) Zero if level 1 did not detect condition requiring abend. Otherwise indicates program level interrupted by level 1. | '06A9'* RTRB4 (RTRSVB) Save area for abend routine (CXAABND). |
| '06AA'* RTRB5 (RTRL5KEY) Level 5 protect key at time of protection exception. | '06AB'* RTRB6 (RTRC1KEY) Channel adapter-1 protect key at the time of channel adapter check in level 1 for protection exception. | '06AC'* RTRB7 (RTRC2KEY) Channel adapter-2 protect key at the time of channel adapter check in level 1 for protection exception. | '06AD'* RTRB8 (RTRCAER) Retry counter for program level 1 channel adapter checks. |
| '06AE'* RTRB9 (RTRIOER) Retry counter for program level 1 in/out instruction checks. | '06AF'* RTRB10 (RTRCMER) Retry counter for program level 1 communication scanner checks. | '06B0'* RTRB11 (RTRLVLIT) Program level interrupted at last program level entry. | '06B1'* RTRB12 (RTR3PUR) Reinitialize program level 3 unresolved interrupt counter. |
| '06B2'* RTRB13 (RTR1PUR) Reinitialize program level 1 unresolved interrupt counter. | '06B3'* RTRB14 (RTR1CAE) Reinitialize program level 1 channel adapter check counter. | '06B4'* RTRB15 (RTR1IOE) Reinitialize program level 1 in/out instruction check counter. | '06B5'* RTRB16 (RTR1CME) Communication scanner check counter. |
| '06B6'* RTRB17** (RTRFEESC) Field engineering hook/escape byte. | '06B7'* RTRB18 (RTRS1CTL) Communication scanner-1 mask for LIB disable functions. | '06B8'* RTRB19 (RTRS2CTL) Type 2 scanner- 2 mask for LIB disable functions. | '06B9'* RTRB20 (RTRS3CTL) Type 2 scanner-3 mask for LIB disable functions. |

* Absolute storage location in hex.

**Indicates a byte expansion follows.

| | | | |
|---------|--|---------|---|
| '06BA'* | RTRB21 (RTRS4CTL) Type 2 scanner- 4 mask for LIB disable func- tions. | '06BB'* | PADDB Excess pad area for expansion. |
| | | '06C0'* | 32 halfwords of invalid op-codes. |

If the type 1 scanner is installed, the following fields are included in the last 64 bytes of the XDB:

| | | | |
|---------|--|---------|---|
| '06F0'* | CCPT1CHR Entry to type 1 communication scanner character service (CXBTRP2). | '06F2'* | BCBL2 Secondary entry for type 1 communica- tion scanner character service (CXBTRP20). |
|---------|--|---------|---|

*Absolute storage location in hex.

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|---|--------------------|---|
| '0682' | 1... .. | PEPFLG | PEP flag bits. (NCP/VS) EP currently using channel adapter. |
| '0685' | 1...1...1...1...1...1...1...1...1... .. | SYSB1 (SYSMASK) | Control byte for dispatcher flags. Appendage task in progress. System task is active. Level 3 disabled. Level 3 active. BHRs in execution. Dispatcher service required. Level 4 disabled. (Reserved). |
| '0689' | 1...1...1...1...1...1...1...1...1... .. | SYSB5 (SYSSMI) | Buffer pool and network status. Quiesce in progress. Deactivate Invite command has been processed, do not poll during service seeking. Auto network shutdown initiated. Queued allocations in progress. Quiesce message required. Channel CWAR invalidated because buffer pool depleted. Waiting for a buffer. (Reserved). |

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|--------|--|---------------------|---|
| '068A' | 1... .. .1...1...1... 1...1.. | SYSB6 (SYSFLG0) | General communication byte. Selective system reset. Checkpoint option selected. Auto network shutdown option selected. 1 = system \leq 64K, 0 = system \geq 64K. Return data to host on error. Critical situation notification option selected. Online test option selected. Auto network shutdown was initiated from the panel. |
| '068B' | X'01' X'02' X'03' X'05' X'06' X'07' | SYSB7 (SYSFLG1) | Field used by dump to determine storage load. (NCP/VS) NCP EP PEP NCP/LR PEP/LR NCP/R |
| '0692' | 1... .. .1... .. | SYSB19 (SYSFLG2) | General communication byte. At least one type 2 channel adapter is inoperable. Panel support (NCP/VS): 1 = NCP 0 = EP |
| '06B6' | 1... .. .1... .. | RTRB17 | Field engineering hook / escape byte. Allow additional register range (AARR): 1 = dump 0 = no dump |

Size in bytes: 128(80)

Located in: Controller storage beginning at location X'0700'.

Created by: NCP generation.

Pointer to XDH: None. Fixed location.

Function: Contains frequently accessed system control fields.

ROS Contained Code Save Area Sub-Block (XDHROS)
The following fields are present in a dump.

| | | | |
|--------|---|--------|---|
| '0700' | ROSH1 (ROSWK1) Work area for IPL phase 3 channel command word. | '0702' | ROSH2 (ROSSVADR) Program level 1 adapter interrupt requests (external register X'76'). |
| '0704' | ROSH3 (ROSSVCCR) Program level 1 CCU checks (external register X'7D'). | '0706' | ROSH4 (ROSSVCCU) Program level 1 CCU interrupt requests (external register X'7E'). |
| '0708' | ROSH5 (ROSWK2) Work area for dual ROS and 3704 ROS standalone diagnostics. | '070A' | ROSH6 (ROSWK3) Work area for dual ROS type 1 load and 3704 ROS standalone diagnostics. |
| '070C' | ROSH7 (ROSWK4) Work area for standalone channel adapter diagnostics (3704 only). | '070E' | ROSH8 (ROSWK5) Work area for 3704 ROS while loading over the type 1 channel adapter. |

The following fields are present during program execution.

| | | | |
|----------|---|--------|--|
| '0700'** | TMRF (CYATMPTR) Channel vector table save area for timer. | '0702' | TIMH4 (TIMCHTD) Attention delay interval for channel adapter. |
| '0704' | TIMH1 (TIMCHTOS) Attention time-out field for secondary channel adapter. | '0706' | TIMH8 (TIMCHTO) Attention time-out field for primary channel adapter. |

**Fields used by PEP.

Bit Service Interrupt Module Control Block (6 bytes) (XDHBSIP)

| | | | |
|--------|--|--------|---|
| '0708' | SYSH22 (BSPSAVE) Saved BCBL2 address interlock. | '070A' | SYSH23 (BSPFUNC) Function control switch for type 1 scanner panel-initiated ICW display. |
| '070C' | SYSH24 (BSPDISP) Scanner data set leads display. | '070E' | RTRH2 (RTRSW) Program level 3 router return entry point (CXCCRTRR). |

The following fields (X'0710' - X'072A') are used by NCP/VS only.

| | | | |
|----------|--|----------|---|
| '0710'** | QCBH1 (QCBF)* (QCBFLAGS) EP flags | '0712'** | QCBT (QCBTIO) QCB table. |
| '0714'** | PDSOF (PDSOFRST) Address pointer to first CCB in the priority data service out queue. | '0716'** | PDSOL (PDSOLAST) Address pointer to the last CCB in the priority data service out queue. |
| '0718'** | DSOF (DSOFRST) Address pointer to the first CCB in the data service out queue. | '071A'** | DSOL (DSOLAST) Address pointer to the last CCB on the data service out queue. |
| '071C'** | DSIF (DSIFRST) Address pointer to the first CCB in the data service in queue. | '071E'** | DSIL (DSILAST) Address pointer to the last CCB in the stacked status queue. |
| '0720'** | SOF (SOFRST) Address pointer to the first CCB in the status out queue. | '0722'** | SOL (SOLAST) Address pointer to the last CCB in the status out queue. |
| '0724'** | SNOF (SNOFRST) Address pointer to the first CCB in the sense out queue. | '0726'** | SNOL (SNOLAST) Address pointer to the last CCB in the sense out queue. |
| '0728'** | SSF (SSFRST) Address pointer to the first CCB in the stacked status queues. | '072A'** | SSL (SSLAST) Address pointer to the last CCB in the stacked status queue. |

*Indicates a byte expansion follows.

**Fields used by PEP.

The following fields (X'0710' - X'072A') are used by NCP V1M2 only.

| | | | |
|--------|--|--------|--|
| '0710' | RTRH5 (RTRPNL) Entry point for level 3 panel reader. | '0712' | TIMH5 (TIMRSTAB) RAS work table pointer. |
| '0714' | TIMH7 (TIMSWICH) RAS and line timer switch. | | |

RAS Scan-Control Sub-Block (XDHRST) (NCP V1M2 only)

| | | | |
|--------|--|--------|--|
| | | '0716' | RSTH1 (RSTSUB1) Number of scans in sub-period 1. |
| '0718' | RSTH2 (RSTSUB2) Number of scans in sub-period 2. | '071A' | RSTH3 (RSTWORK) Number of scans in sub-period 3. |
| '071C' | Reserved (16 bytes) | | |

Type 1 Scanner QCB for Character Transfer Between Character and Bit Service (XDHCSPO)

| | | | |
|----------|---|----------|---|
| '072C'** | CSPQH1 (CSPQOFF) First BCB address. BCBs are taken off the chain from this end. | '072E'** | CSPQH2 (CSPQ2) (CSPQON) Last BCB address. BCBs are added to the chain at this end. |
| '0730'** | SVCO SVCOUT | '0732' | (Reserved) |
| '0734' | (Reserved) | | |

**Fields used by PEP.

| | |
|---|--|
| | '0736' CCPQH1 (CCPQOFF) Address of first CCB. CCB's are taken off the queue from this end. |
| '0738' CCPQH2 (CCPQON) Address of last CCB. CCB's are added to the chain at this end. | |

Timer Sub-Control Block (XDHTIM)

| | |
|---|---|
| | '073A' (Reserved). |
| '073C' TIMH2 (TIMWKTAB) Address of current line timer control/work table. | '073E' TIMH3 (TIMWKTNX) Pointer to the next low-resolution CTB subchain to be serviced. |
| '0740' TIMH9 (TIMCTBAD) Pointer to start of CXTCTB | '0742' TIMH6 (TIMPADH) (Reserved) |

Supervisor Sub-Control Block (XDHSYS)

| | |
|--|---|
| '0744' SYSH3 (SYSIQON) Pointer to end of system immediate queue. | '0746' SYSH4 (SYSIQOFF) Pointer to the beginning of the system immediate queue. |
| '0748' SYSH9 (SYPQON) Pointer to the end of the system productive queue. | '074A' SYSH10 (SYSPQOFF) Pointer to the beginning of the system productive queue. |

| | | | |
|--------|---|--------|--|
| '074C' | SYSH18 (SYSAQON) Pointer to the end of the system non-productive queue. | '074E' | SYSH19 (SYSAQOFF) Pointer to the beginning of the system non-productive queue. |
| '0750' | SYSH20 (SYSNQON) First triggered non-productive QCB. | '0752' | SYSH21 (SYSNQOFF) Last triggered non-productive QCB. |
| '0754' | SYSH1 (SYSBPCBC) Current free buffer count. | '0756' | SYSH2 (SYSBPTBC) Free buffer threshold count + 1. |
| '0758' | SYSH5 (SYSLINES) Number of communication lines. | '075A' | SYSH8 (DCTAQCB) (SYSAQCB) System active queue control block. |
| '075C' | SYSH11 (DCTSPool) (SYSSPOOL) Pointer to first buffer in system save area pool. | '075E' | SYSH12 (DCTSAVEK) (SYSSAVEK) System save area buffer pool allocation count. |
| '0760' | SYSH13 (DCTABND) (SYABND) System abend code. | '0762' | SYSH14 (SYSBINTM) System binary time of day in seconds. |
| '0764' | SYSH15 (Reserved). | '0766' | SYSH16 (SYSCUREQ) Time value for earliest expiring current system timer request. |
| '0768' | SYSH17 (Reserved). | '076A' | (Reserved). |
| '076C' | (Reserved). | '076E' | (Reserved). |

Channel Adapter Interrupt Handler Save Area (XDCHSV)

| | | | |
|--------|--|--------|---|
| '0770' | CHSVH1 (CHSVBKSZ) Maximum byte count to host per host start I/O. | '0772' | CHSVH2 (CHSVCHB) Pointer to CHB or COB. |
|--------|--|--------|---|

Communication Control Program Save Area (XDHCCP)

| | |
|--------|--|
| '0774' | CCPH1 (CCPSAVE) Save area for program level 3 CCP. |
|--------|--|

Program Level 1 / 3 Router Sub-Control Block (XDHRTR)

| | | | |
|--------|------------------------------------|---|--|
| | '0776' | RTRH1 (RTRBARSV) Save area for scanner buffer address register. | |
| '0778' | (Reserved). | '077A' | (Reserved). |
| '077C' | RTRH6 (RTRL2G0A) (Reserved). | '077E' | RTRH10 (RTRCASEL) Save area for CA selection mask. |

Byte Expansions

| Offset | Bit Pattern/ Hex Value | Field Name | Contents |
|---------|--|------------|--|
| X'0710' | 1... .. .1...1...1...1... | QCBF | EP flags. Set suppress out down. Set stacked status service. Set sense service. Set TIO sequence. Set single byte mode. |

Appendix A: BTU Commands and Modifiers

Following is a list of the BTU commands with a brief description of each modifier and the hex value and acronyms of each.

Contact Command (X'06')

No modifiers

Control Command (X'08')

| Modifier | Hex | Meaning |
|--|-----|--|
| Display line status | 01 | See Appendix C in the NCP PLM listed in the preface. |
| Replace session initiation information | 02 | |
| Activate Invites | 03 | |
| Deactivate Invites | 04 | |
| Copy session initiation information | 05 | |
| Display device status | 06 | |
| Request device statistics | 07 | |
| Display storage | 08 | |
| Set time and date | 09 | |
| Set channel mode secondary | 0A | |
| Display associated line's resource ID | 0B | |
| Activate line trace | 0C | |
| Terminate line trace | 0D | |
| Activate group | 10 | |
| Deactivate group orderly | 11 | |
| Change speed | 12 | |
| Set channel mode primary | 15 | |
| Copy destination mode | 18 | |
| Copy device session information | 21 | |
| Replace device session information | 22 | |
| Reset error lock | 41 | |
| Reset device queues | 42 | |
| Request control mode reset | 43 | |
| Reset immediate | 44 | |
| Reset online terminal test | 48 | |
| Switch to backup | 4A | |
| Switch from backup to primary | 4C | |
| Reset conditional | 50 | |
| Reset at end of command | 60 | |
| Change line service seeking pause | 84 | |
| Change line negative poll response limit | 85 | |
| Change session limit | 86 | |
| Change retry count | 87 | |
| Activate device | 88 | |
| Deactivate device | 89 | |

| | |
|--------------------------------------|----|
| Change device transmission limit | 8C |
| Modify block handler set association | 8D |
| Activate line | 98 |
| Deactivate line orderly | 99 |
| Set destination mode | 9A |
| Deactivate line halt | C2 |

Disconnect Command (X'07')

| Modifier | | Hex | Meaning |
|--------------------------------|-----|-----|---|
| Disconnect normal | D | 00 | No modifier. |
| Disconnect with Invite | Di | 01 | Executed as a Disconnect normal command followed by an Invite normal command. |
| Disconnect with end-of-call | De | 02 | For switched lines, this modifier results in the physical connection between the terminal and the communications controller being broken. For all other lines, this modifier is the same as normal. |
| Disconnect with EOC and Invite | Dei | 03 | Executed as a Disconnect with end-of-call followed by an Invite command. |

Invite Command (X'05')

| Modifier | | Hex | Meaning |
|--|----|-----|--|
| Invite normal | I | 00 | Unit of data for this command is that specified at NCP generation. |
| Invite block | Ib | 01 | Unit of data for this command is the block. |
| Invite message | Im | 02 | Unit of data for this command is the message. |
| Invite transmission | It | 03 | Unit of data for this command is the transmission. |
| Invite transmission with Disconnect | ID | 04 | Executed as an Invite transmission command followed by a Disconnect command. |
| Invite with auto restart | Ia | 05 | Executed as unbounded series of Invite with Disconnect commands. This command must be terminated with a reset request. |
| Invite perpetual (valid only for clusters) | ip | 06 | Executed as an unbounded series of Invite transmission commands with no intervening Disconnect commands. |

Read Command (X'01')

| Modifier | | Hex | Meaning |
|-----------------------------------|----|-----|---|
| Read normal | R | 00 | Unit of data for this command is that specified at NCP generation. |
| Read block | Rb | 01 | Unit of data for this command is the block. |
| Read message | Rm | 02 | Unit of data for this command is the message. |
| Read transmission | Rt | 03 | Unit of data for this command is the transmission. |
| Read transmission with Disconnect | Rd | 04 | Executed as a Read transmission command followed by a disconnect command. |
| Read with Invite | Ri | 05 | Executed as a Read transmission with Disconnect followed by an Invite normal command. |

Restart Command (X'04')

| Modifier | | Hex | Meaning |
|---|--|-----|---|
| Line | | 00 | The BTU contains a checkpoint record for a line. |
| Device | | 01 | The BTU contains a checkpoint record for a device. |
| Replace session initiation information for a line | | 02 | The BTU contains session initiation information for a line. |
| Replace session initiation information for a device | | 22 | The BTU contains session initiation information for a device. |

Test Command (X'03')

| Modifier | | Hex | Meaning |
|---|--------|-----|--|
| Test device normal | T | 00 | Tests a device. |
| Test device with Contact | Tc | 01 | Establishes a session with the device to be tested. |
| Test device with Disconnect | Td | 02 | Ends a session with the device to be tested. |
| Test device with Contact and Disconnect | Tcd | 03 | Establishes and ends a session with the device to be tested. |
| Test line normal | TI | 04 | Tests a line. |
| Test line with Contact | Tlc | 05 | Establishes a session with the line to be tested. |
| Test line with Disconnect | Tld | 06 | Ends a session with the line to be tested. |
| Test line with Contact and Disconnect | Tlcd07 | | Establishes and ends a session with the line to be tested. |

Write Command (X'02')

| Modifier | | Hex | Meaning |
|--|-----|-----|---|
| Write normal | W | 00 | Unit of data is one block. |
| Write with end-of-message | Wm | 01 | Unit of data is one block followed by the appropriate control sequence or character for an end of message. |
| Write with end-of-transmission | Wt | 02 | Unit of data is one block followed by the control sequence for end of transmission. |
| Write with Disconnect | Wd | 03 | Executed as a Write transmission command followed by a Disconnect command. |
| Write with Read (implied EOT) | Wr | 06 | Executed as a Write command followed by a Read command. |
| Write with Invite | Wi | 07 | Executed as a Write command with end-of-transmission followed by a Disconnect command and then an Invite command. |
| Write with Contact* | Wc | 08 | Executed as a Contact command followed by a Write normal command. |
| Write with Contact* (implied EXT) | Wcm | 09 | Executed as a Contact command followed by a Write with end-of-message. |
| Write with Contact* (implied EOT) | Wct | 0A | Executed as a Contact command followed by a Write with end-of-transmission. |
| Write with Contact* and Disconnect (implied ETX & EOT) | Wcd | 0B | Executed as a Contact command followed by a Write with end-of-transmission followed by a Disconnect command. |
| Write with Contact* and Read | Wcr | 0E | Executed as a Contact command followed by a Write with end-of-transmission followed by a Read normal command. |

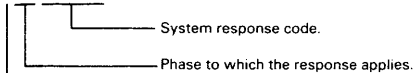
*Contact may not begin a telephone connection to a BSC call-in device.

Appendix B: BTU Responses

This appendix lists the responses that are returned to the host in the BTU. The response comprises two bytes: system response (BCUSRES) and extended response (BCULRES). The extended response is also referred to as the line response.

System Response Byte

0000 0000



Phase 0 - Validation of BTU. There is no normal response returned to the host if the command is valid. However, unsolicited responses are sometimes sent to the host in phase 0 that are not related to the command.

Phase 1 - I/O to a communications line.

Phase 2 - Additional I/O to a communications line when multiple I/O operations take place. For example, Write with Read, Write with Disconnect, etc.

Phase 3 - Usually the final normal response to a command. However, if the command has an Invite modifier (for example, Write with Invite), a phase 3 normal response may be returned for the write portion of the command and a phase 0 error response returned later for the Invite portion of the command.

1 = error response.
0 = OK response.

| Command & Modifier | Phase 0* Error | Phase 1 | | Phase 2 | | Phase 3** Normal |
|--------------------|----------------|---------|--------|---------|--------|------------------|
| | | Error | Normal | Error | Normal | |
| I | Any part | I | I | | | I(final) |
| Ib | Any part | I | | | | Ib |
| Im | Any part | I | I | | | Im |
| It | Any part | I | I | | | It |
| Id | Any part | I | I | D | | Id |
| Ia | Any part | I | I | D | | Ia |
| Ip | Any part | I | I or R | | | It or Rt |
| D | Any part | D | | | | D |
| De | Any part | D | | | | De |
| Di | Any part | D/I | I | | | D/I(final) |
| Dei | Any part | D/I | I | | | D/I(final) |
| W | Any part | W | | | | W |
| Wm | Any part | W | | | | Wm |
| Wt | Any part | W | | Wt | | Wt |
| Wd | Any part | W | | D | | Wd |
| Wi | Any part | W/I | I | D | | Wd/I(final) |
| Wr | Any part | W | | Wt/R | Wt/R | R(final) |
| Wc | Any part | C/W | | | | Wc |
| Wcm | Any part | C/W | | | | Wcm |
| Wct | Any part | C/W | | Wt | | Wct |
| Wcd | Any part | C/W | | D | | Wcd |
| Wcr | Any part | C/W | | Wt/R | Wc/R | R(final) |
| R | Any part | R | R | | | R(final) |
| Rb | Any part | R | | | | R(final) |
| Rm | Any part | R | R | | | Rm |
| Rt | Any part | R | R | | | Rt |
| Rd | Any part | R | R | D | | Rd |
| Ri | Any part | R/I | R/I | D | | Rd I(final) |
| C | Any part | C | | | | C |

* Phase 0 error responses can be returned for any portion of a BTU on which there is a validity error.

** There are no phase 3 error responses for TP commands.

Phase 0 Error Responses

| Response (hex) | Meaning |
|----------------|--|
| 81 | Invalid resource ID. |
| 82 | Invalid command. |
| 83 | Invalid modifier. |
| 84 | Reset or Deactivate in progress. |
| 85 | Device inactive. |
| 86 | Line inactive. |
| 87 | Command not valid for resource. |
| 88 | Command syntax error. |
| 89 | Command rejected; did not conform to BSC specifications. |
| 8A | Invalid control data length. |
| 8B | Reset not performed. |
| 8C | Data not resident in storage. |
| 8D | Dial set queue limit reached. |
| 8E | Line and device incompatibility on switched call-out. |
| 8F | Invalid text length. |
| 91 | Invalid control data. |
| 92 | Incomplete BTU. |
| 93 | Deactivate Line Orderly or Deactivate Device command rejected because of error on one or more of the devices. |
| 94 | Data in use. |
| 95 | Invalid Control command modifier or Control command not valid for resource. |
| 96 | OLTT command rejected; queue not empty. |
| 98 | Multiple Dial requests. |
| 99 | Mode inconsistency. (Request was made to alter the mode of a resource, but the resource was already in that mode.) |
| 9A | Buffers required to complete the operation are not available; system in slowdown mode. |
| 9B | Command rejected; system in auto network shutdown. |
| 9C | Command rejected; error lock set. |
| 9D | Command rejected; secondary channel adapter not operative. |
| 9E | Command rejected; line deactivated or command reset. |

Phase 0 Unsolicited Responses

| Response (hex) | | Meaning |
|----------------|--|--|
| 00 | | Invalid bit configuration. |
| 01 | | Attention time-out or unrecoverable error on current primary channel adapter. |
| 03 | | Device association completed. |
| 04 | | MTA device identified. |
| 05 | | Channel adapter set to primary mode. |
| 06 | | Channel adapter set to secondary mode. |
| 07 | | Entering system slowdown. |
| 08 | | Leaving system slowdown. |
| 09 | | Initialization complete. |
| 0A | | MDR records accompany the BTU. |
| 1B | | Auto network shutdown initiated via channel time-out or channel adapter failure. |
| 1C | | Auto network shutdown initiated via panel. |
| 1D | | Network shut down via auto network shutdown. |
| 1E | | Serviceability aid—host logging. |

Phase 1, 2, and 3 Error Responses

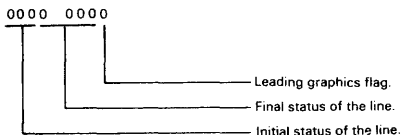
| Response (hex) | | | Meaning |
|----------------|---------|---------|---|
| Phase 1 | Phase 2 | Phase 3 | |
| A0 | C0 | E0 | Data check. |
| A1 | C1 | E1 | Possible intervention required. |
| A2 | C2 | E2 | Intervention required. |
| A3 | C3 | E3 | Negative poll limit reached—WAIT option. |
| A4 | C4 | E4 | Yielded to contention. |
| A5 | C5 | E5 | Device error—BSC status pending. |
| A6 | C6 | E6 | BSC ID error. |
| A7 | C7 | E7 | Line trace terminated due to error. |
| A8 | C8 | E8 | OLTT command or Reset OLTT Control command processing terminated. |
| A9 | C9 | E9 | Session not started due to hardware error. |
| AA | CA | EA | BSC error status message. |
| AB | CB | EB | General poll operation aborted due to error. |
| B3 | D3 | F3 | Break received on this block. |
| B8 | D8 | F8 | Contact rejected—session started. |
| B9 | D9 | F9 | Dial data inconsistency. |
| BA | DA | FA | Buffers required to complete operation are not available. |
| BE | DE | FE | Command rejected; line deactivated or command reset. |

Phase 1, 2, and 3 Normal Responses

| Response (hex) | | | Meaning |
|----------------|---------|---------|---|
| Phase 1 | Phase 2 | Phase 3 | |
| 20 | 40 | 60 | Command executed OK this far. (Pertains to all commands not represented by 22, 42, or 62.) Leading graphics received. One of the following commands executed OK this far: <ul style="list-style-type: none"> Read or Invite Write (in conversational mode). WR or WCR commands in the read phase. |
| 21 | 41 | 61 | |
| 22 | 42 | 62 | |
| 23 | 43 | 63 | Negative poll limit reached—QUEUE option. |
| 24 | 44 | 64 | OLTT request message. |
| 25 | 45 | 65 | BSC status message. |
| 26 | 46 | 66 | Negative poll limit reached—NOWAIT option. |
| 27 | 47 | 67 | Line trace output. |

Extended Response Byte

The extended response byte contains either a normal extended response or a conditional extended response. The normal extended response appears in both BCULRES and the second byte of IOBSTAT. It has the following format:



A conditional extended response applies to one specific system response and does not have a fixed format. It appears only in BCULRES.

Normal Extended Responses

| | Initial Status |
|-----------|-----------------------|
| 000. | Control. |
| 001. | Text. |
| 010. | Transparent text. |
| 011. | Heading. |
| 100. | Special. |
| 111. | Hardware /user error. |

Final Status when Initial Status = Control, Text, Transparent Text, or Heading.

| | |
|-----------|-------------------------------|
| ...0 000. | Timeout (something received). |
| ...0 010. | Cutoff. |
| ...0 011. | Abort block. |
| ...0 100. | EOT HALTED ERP. |
| ...0 101. | DLE control end. |
| ...0 110. | Wrong ACK. |
| ...0 111. | Negative ACK. |
| ...1 000. | Received sub-block. |
| ...1 001. | End of text. |
| ...1 010. | End of block. |
| ...1 011. | Enquiry. |
| ...1 .00. | EOT. |
| ...1 .01. | Reverse interrupt. |
| ...1 110. | Positive ACK. |
| ...1 111. | WACK. |

Final Status when Initial Status = Special

| | |
|-----------|-------------------------------|
| ...0 000. | Timeout (nothing received). |
| ...0 001. | Command rejected. |
| ...0 010. | Buffer pool depleted. |
| ...0 011. | Selected. |
| ...0 100. | Received disconnect signal. |
| ...0 101. | Lost data. |
| ...0 110. | Command reset. |
| ...0 111. | Polled. |
| ...1 000. | Transmitted sub-block. |
| ...1 001. | EOT sent after WACK received. |

| | |
|-----------|-------------------------|
| ...1 101. | Received break in text. |
| ...1 011. | Polling stop. |
| ...1 100. | EOT transmitted. |
| ...1 101. | Received break. |
| ...1 110. | Disconnected. |
| ...1 111. | Connected. |

Final Status when Initial Status = Hardware/User Error

| | |
|-----------|--|
| ...0 000. | User error. |
| ...0 010. | Communication scanner check. |
| ...0 100. | Adapter check. |
| ...0 101. | Adapter feedback check. |
| ...0 110. | Equipment check. |
| ...1 000. | Modem error. |
| ...1 001. | Transmit clock or clear-to-send error. |
| ...1 010. | DSR-on check. |
| ...1 100. | DSR-off check. |
| ...1 110. | Autocall check. |
| ...1 111. | Program failure. |

Leading Graphics Flag

| | |
|-----------|----------------------------|
|1 | Leading graphics received. |
|-----------|----------------------------|

Conditional Extended Responses

Extended Response when System Response = X'60' and the BTU is a Sense BTU.

| | |
|-----------|---|
| 0000 0000 | OK-expected response received. |
| 1.00 0.0. | Trunk inactive. |
| .100 0.0. | Remote 3705/3704 inactive. |
| ..00 .100 | Error lock already set. |
| 0001 0100 | No answer to poll - error lock set. |
| 0000 1100 | Permanent error - error lock set. |
| ..00 0001 | IPL lock already set. |
| 0000 0011 | IPL-required received - error lock set. |

Extended Response when System Response = X'9F'

| | |
|-------|---|
| X'81' | IPL lock on. |
| X'82' | Change-speed command is invalid for the line. |
| X'83' | Specified line is unavailable. |
| X'84' | Error lock. |
| X'85' | Invalid node. |
| X'E0' | Switch-line-mode command was received but line not generated as mode-switchable. |
| X'E1' | Switch-line-mode command was received but a command is already executing on the line or line trace is active on the line. |

Extended Response when System Response = X'EF'

| | |
|-------|------------------------------|
| X'01' | IPL required - PIOQ. |
| X'02' | IPL required - BOQ. |
| X'11' | Trunk error - PIOQ. |
| X'12' | Trunk error - BOQ. |
| X'81' | IPL/Dump in progress - PIOQ. |
| X'82' | IPL/Dump in progress - BOQ. |



24

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Appendix C: Emulation Program Command Codes

Operation Code

| EP** | S/360 and S/370 | Command |
|-----------|--------------------|--------------------|
| 0000 0... | 00 | Test I/O |
| 0000 1... | 01 | Write |
| 0001 0... | 02 | Read |
| 0001 1... | 03 | I/O No-op |
| 0001 1... | 12 | Diagnostic Read* |
| 0001 1... | 05 | Diagnostic Write* |
| 0001 1... | 13 | Set Address Zero* |
| 0001 1... | 17 | Set Address One* |
| 0001 1... | 1B | Set Address Two* |
| 0001 1... | 1F | Set Address Three* |
| 0001 1... | 1D | Diagnostic Poll* |
| 0010 0... | 04 | Sense |
| 0010 1... | 15 | Wrap |
| 0011 0 | 06 | Prepare |
| 0100 0... | 41 | Write Break |
| 0100 1... | 09 | Poll |
| 0101 0... | 0A | Inhibit |
| 0101 1... | 19 | Poll SOH |
| 0110 0... | 42 | Read Clear |
| 0110 1... | 0D | Break |
| 0111 0... | 0E | Search |
| 0111 1... | 2F | Disable |
| 1000 0... | 27 | Enable |
| 1000 1... | 29 | Dial |
| 1001 0... | 1E | Address Prepare |
| 1001 1... | 23 | Set Mode |

Flags used during initial command execution (ICE)

| | |
|---------|---|
|1.. | End with intervention required instead of command reject. |
|1. | Sense command |
|1 | Line must be enabled before this is accepted. |

Flags used after ICE

| | |
|---------|-----------------|
|1.. | Command end |
|1. | Pseudo read |
|1 | Pseudo read end |

* Treated by the emulation program as a no-op.

** The EP command is located in the CCBCMD field of the EP CCB.



1

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Appendix D: 3704 and 3705 Instruction Set

| Instruction | Format Code | Mnemonic | Operand Field Format |
|---------------------------------|-------------|----------|----------------------|
| Add Character Register | RR | ACR | R1(N1),R2(N2) |
| Add Halfword Register | RR | AHR | R1,R2 |
| Add Register | RR | AR | R1,R2 |
| Add Register Immediate | RI | ARI | R(N),1 |
| And Character Register | RR | NCR | R1(N1),R2(N2) |
| And Halfword Register | RR | NHR | R1,R2 |
| And Register | RR | NR | R1,R2 |
| And Register Immediate | RI | NRI | R(N),1 |
| Branch | RT | B | T |
| Branch and Link | RA | BAL | R,A |
| Branch and Link Register | RR | BALR | R1,R2 |
| Branch on Bit | RT | BB | (R(N),M),T |
| Branch on Count | RT | BCT | (R(N),T |
| Branch on C Latch | RT | BCL | T |
| Branch on Z Latch | RT | BZL | T |
| Compare Character Register | RR | CCR | R1(N1),R2(N2) |
| Compare Halfword Register | RR | CHR | R1,R2 |
| Compare Register | RR | CR | R1,R2 |
| Compare Register Immediate | RI | CRI | R(N),1 |
| Exclusive Or Character Register | RR | XCR | R1(N1),R2(N2) |
| Exclusive Or Halfword Register | RR | XHR | R1,R2 |
| Exclusive Or Register | RR | XR | R1,R2 |
| Exclusive Or Register Immediate | RI | XRI | R(N),1 |
| Exit | EXIT | EXIT | |
| Input | RE | IN | R,E |
| Insert Character | RS | IC | R(N),D(B) |
| Insert Character and Count | RSA | ICT | R(N),B |
| Load | RS | L | R,D(B) |
| Load Address | RA | LA | R,A |
| Load Character Register | RR | LCR | R1(N1),R2(N2) |
| Load Character with Offset Reg. | RR | LCOR | R1(N1),R2(N2) |
| Load Halfword | RS | LH | R,D(B) |
| Load Halfword Register | RR | LHR | R1,R2 |
| Load Halfword with Offset Reg. | RR | LHOR | R1,R2 |
| Load Register | RR | LR | R1,R2 |
| Load Register Immediate | RI | LRI | R(N),1 |
| Load with Offset Register | RR | LOR | R1,R2 |
| Or Character Register | RR | OCR | R1(N1),R2(N2) |
| Or Halfword Register | RR | OHR | R1,R2 |
| Or Register | RR | OR | R1,R2 |
| Or Register Immediate | RI | ORI | R(N),1 |
| Output | RE | OUT | R,E |
| Store | RS | ST | R,D(B) |
| Store Character | RS | STC | R(N),D(B) |
| Store Character and Count | RSA | STCT | R(N),B |
| Store Halfword | RS | STH | R,D(B) |
| Subtract Character Register | RR | SCR | R1(N1),R2(N2) |
| Subtract Halfword Register | RR | SHR | R1,R2 |
| Subtract Register | RR | SR | R1,R2 |
| Subtract Register Immediate | RI | SRI | R(N),1 |
| Test Register Under Mask | RI | TRM | R(N),1 |



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Appendix E: Input/Output Register Functions

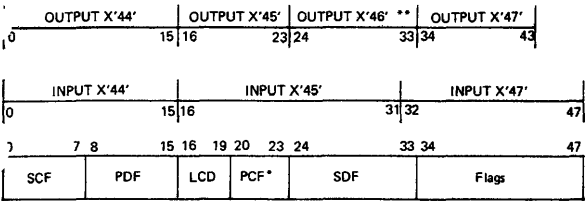
INPUT REGISTERS

| Register (Hex) | Function | |
|-------------------|--|--------------------------------------|
| 40 | Type 1 Scanner Unused. | Type 2 Scanner Interface address. |
| 41 | Interface address. | Unused. |
| 42 | Control A. | Unused. |
| 43 | Control B;C. | Check register. |
| 44 | Status. | ICW input register 0-15. |
| 45 | Unused. | ICW input register 16-31. |
| 46 | Unused. | Display register. |
| 47 | Unused. | ICW input register 32-45. |
| Type 2 CA | | |
| 50 | INCWAR | |
| 51 | OUTCWAR | |
| 52 | Control word byte count. | |
| 53 | Sense register. | |
| 54 | Status register. | |
| 55 | Control register. | |
| 56 | Check register | |
| 57 | Unused. | |
| 58 | Channel bus out diagnostic register. | |
| 59 | Cycle steal address register. | |
| 5A | Channel adapter data buffer. | |
| 5B | Channel tag diagnostic register. | |
| 5C | Command register. | |
| 5D | Unused. | |
| 5E | Unused. | |
| Type 1 CA | | |
| 60 | Initial selection control. | |
| 61 | Initial selection address and command. | |
| 62 | Data/status control. | |
| 63 | Address and ESC status. | |
| 64 | Data buffer bytes 1 and 2. | |
| 65 | Data buffer bytes 3 and 4. | |
| 66 | NSC status byte. | |
| 67 | Control. | |
| CCU | | |
| 70 | Storage size installed. | |
| 71 | Panel A address/data bits. | |
| 72 | Panel display/function select switch controls. | |
| 73 | Insert storage protection key. | |
| 74 | Lagging address register (LAR) | |
| 76 | Adapter interrupt request group 1. | |
| 77 | Adapter interrupt request group 2. | |
| 79 | Utility | |
| 7B | BSC CRC register. | |
| 7C | SDLC CRC register. | |
| 7D | CCU check register. | |
| 7E | CCU interrupt requests, group 1. | |
| 7F | CCU interrupt requests, group 2. | |

OUTPUT REGISTERS

| Register (Hex) | Function | |
|-------------------|--|-------------------------------|
| | Type 1 Scanner | Type 2 Scanner |
| 40 | Set Mode bit override and override remember. | Interface address. |
| 41 | Start scanner and reset L2 bit service request. | Address substitution control. |
| 42 | Control A. | Upper scan limit control. |
| 43 | Control B. | Control. |
| 44 | General control. | ICW 0-15. |
| 45 | Scanner control. | ICW 16-23. |
| 46 | Set character service pending, start scanner, reset L2 bit request. | ICW 24-33, 45 |
| 47 | Force bit service L2 request. | ICW 34-43. |
| | Type 2 CA | |
| 50 | INCCWAR | |
| 51 | OUTCCWAR | |
| 53 | Sense register. | |
| 54 | Status register. | |
| 55 | Control register. | |
| 56 | Reset control register bits. | |
| 57 | Channel adapter mode register. | |
| 58 | Channel bus out diagnostic register. | |
| 5A | Channel adapter data buffer. | |
| 5B | Channel tag diagnostic register. | |
| | Type 1 CA | |
| 60 | Reset initial selection. | |
| 62 | Data status control. | |
| 63 | Address and ESC status | |
| 64 | Data buffer bytes 1 and 2. | |
| 65 | Data buffer bytes 3 and 4. | |
| 66 | NSC status byte. | |
| 67 | Control. | |
| | CCU | |
| 70 | Hard stop. | |
| 71 | Display register 1 | |
| 72 | Display register 2. | |
| 73 | Set key. | |
| 77 | Miscellaneous Control. | |
| 78 | Force CCU checks. | |
| 79 | Utility. | |
| 7C | Set PCI L3. | |
| 7D | Set PCI L4 | |
| 7E | Set mask bits. | |
| 7F | Reset mask bits. | |

Appendix F: Interface Control Word (ICW)



* All bits in the PCF are reset to zero with power-on reset.

** Also sets bit 45.

Figure 12. Interface Control Word (ICW)

ICW Field Definitions

SCF

Bit

- 0 Stop bit check/receive break/abort (SDLC)
- 1 Service request
- 2 Character overrun/underrun
- 3 Modem check
- 4 Receive line signal detector
- 5 Flag detection (SDLC receive)/zero insert remembrance (SDLC trans.)
- 6 Program flag
- 7 Pad flag/zero insert control (SDLC)

PDF Autocall Interface

Bit

- 4 Digit NBR 8
- 5 Digit NBR 4
- 6 Digit NBR 2
- 7 Digit NBR 1

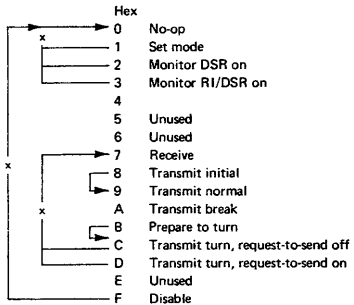
LCD

Hex

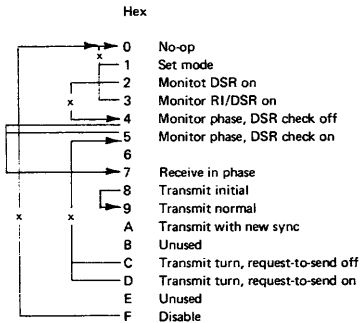
- 0 SS 9/6
- 1
- 2 SS 8/5
- 3 Autocall
- 4 SS 9/7
- 5 SS 10/7
- 6 SS 10/8
- 7 SS 11/8
- 8 SDLC 7
- 9 SDLC 8
- A SDLC 6
- B SDLC 5
- C BSC EBCDIC
- D BSC ASCII
- E Reserved
- F Feedback check

ICW Field Definitions Con't

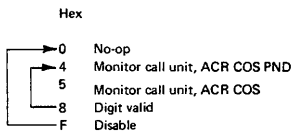
PCF Start/Stop Line Interface



PCF BSC Line Interface

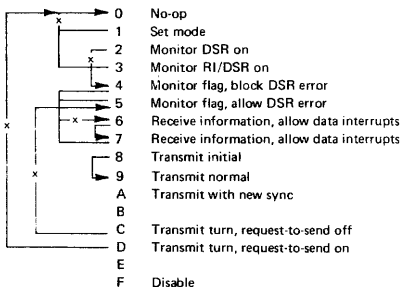


PCF Autocall Interface



PCF SDLC Line Interface

Hex



SDF Autocall Interface

Bit

- 24 Interrupt remember
- 25 Power indicator (PWI)
- 26 Call request (CRQ)
- 27 Data line occupied (DLO)
- 28 Present next digit (PND)
- 29 Digit present (DPR)
- 30 Call originate status (COS)/Data set status (DSS)
- 31 Abandon call and retry (ACR)
- 32 Unused
- 33 Unused

ICW Field Definitions Con't

SDF Set Mode Line Interface

Bit

| | |
|----|--------------------------------|
| 24 | Unused |
| 25 | Unused |
| 26 | Unused |
| 27 | Diagnostic wrap mode. |
| 28 | Set/reset data terminal ready. |
| 29 | Sync bit clock. |
| 30 | External clock. |
| 31 | Data rate select. |
| 32 | Oscillator select bit 1. |
| 33 | Oscillator select bit 2. |

Flags

Bit

| | |
|--------|----------------------------|
| *34-36 | SDLC ones counter. |
| *37 | Last line state. |
| *38 | Display request. |
| 39-40 | Reserved. |
| *41 | Level 2 interrupt pending. |
| 42 | Priority 1. |
| 43 | Priority 2. |
| 44 | NRZI control. |
| 45-47 | Parity |

*These bits are reset to zero with power-on reset.



Appendix G: Network Control Program Abend Codes

When an error that causes an abend (abnormal termination) occurs, the supervisor's abend processor (CXAABND) posts an abend code in halfword direct addressable storage location X'760'. Locating the abend code in the dump gives some insight into the reason for the abnormal termination.

If the condition causing the abend is detected in level 1, the contents of external register X'74' (LAR) are stored at location X'7BC', and the contents of external register X'79' are stored at location X'6A8'. These two registers indicate the address of the failing instruction and the program level that was executing when level 1 was entered.

The first byte of the abend code indicates which portion of the NCP detected the error. The second byte indicates the specific error that was detected.

Errors Detected by I/O Initiation Requests, SVC Decoding, or a Level 1 Interrupt Handling Routine (Byte 0 = X'00')

X'0001' An invalid SVC code was executed.

X'0002' A protection exception occurred.

X'0003' An XIO macro to a communication line specified an invalid QCB address.

X'0004' An XIO macro to the channel specified a BCU containing invalid chain pointers.

X'0005' An XIO macro to the channel specified a BCU containing too much text (more than can ever be transferred with a single host read operation).

X'0006' An XIO macro to the channel specified a BCU enqueued to a system queue.

X'0007' An XIO macro to the channel was used while a task was still waiting on the ECB in the first buffer of the BCU.

X'0008' An XIO macro to the channel specified a BCU in which at least one buffer had too large a text count field in the buffer prefix.

X'0009' An addressing exception occurred.

X'000A' An input/output instruction exception occurred, and retry was not possible.

X'000B' Unassigned.

X'000C' Unassigned.

X'000D' An instruction attempted to branch to storage location X'0000'.

X'000E' A program check occurred in level 1.

X'000F' Unassigned.

X'0010' A level 3 channel adapter interrupt occurred while the channel adapter was active, but the command register (X'56') did not indicate a Read, Write, or Write Break command (type 2 CA only).

X'0011' A level 3 channel adapter interrupt for a host Write or Write Break occurred, and neither zero count override nor channel stop was indicated. One of these conditions should be present for every host Write operation.

X'0012' An initial selection sequence on a type 1 channel adapter was undefined.

X'0013' An outbound BTU had an invalid chain field.

X'0014' A data/status sequence on a type 1 channel adapter was undefined.

X'0015' An XIO to the channel specified a BCU address outside the buffer pool.

X'0016' Unassigned.

X'0017' A level 1 channel adapter error occurred (type 1 CA). A level 1 channel adapter error occurred and the channel save chain was active (type 2 CA).

X'0018' Zero count override was detected on a host read operation.

X'0019' An initial IN CW did not have the zero count override flag set for channel I/O.

X'001A' The retry limit for an input or output instruction was exceeded.

X'001B' The program attempted to execute an invalid operation code.

X'001C' The program attempted to switch channel adapters via an XIO macro when the logic is not generated into the NCP.

X'001D' The program attempted to use an XIO macro for a busy communication line.

X'001E' More than one XIO macro was outstanding for the same BCU.

X'001F' An XIO macro to the channel specified an invalid BTU text count.

X'0020' The INCWAR in a type 2 channel adapter was incorrect (hardware error).

X'0021' The access method pad size is larger than the host buffer unit size.

Errors Detected by Task Management (Byte 0 = X'01')

X'0101' Unassigned.

X'0102' A TRIGGER macro specified an invalid QCB.

X'0103' Unassigned.

X'0104' A reentrant CALL macro specified a non-reentrant subroutine, or a level 5 task issued a reentrant CALL macro to code that is not a subroutine.

X'0105' A level 5 task used a non-reentrant CALL macro when either the calling task or the called subroutine was reentrant.

X'0106' Unassigned.

X'0107' A BHR attempted to use a QPOST macro.

X'0108' A SETIME macro specified an interval greater than 43,200 seconds.

X'0109' A BHR attempted to use the QPOST operand on a SYSXIT macro.

X'010A' Unassigned.

X'010B' Unassigned.

X'010C' A task attempted to use a SYSXIT macro while save area(s) were still allocated to its queue control block.

X'010D' Unassigned.

X'010E' A QPOST macro specified an invalid QCB address.

X'010F' A TPPOST macro specified a BCU with an invalid resource ID.

X'0111' A TPPOST macro specified an invalid BCU address (address low).

X'0112' A TPPOST macro specified an invalid BCU address (address high).

X'0113' Unassigned.

X'0114' A COPYBCU macro specified an invalid old buffer address.

X'0115' Unassigned.

X'0116' A COPYBCU macro specified an invalid new buffer address (address high).

X'0117' A task attempted to use an EXECBHR macro when the point 3 BHR queue was empty.

X'0118' A user BHR dequeued a BCU and failed to return it to the queue (via an INSERT macro) prior to the execution of an IBM BHR.

X'0119' A BHR attempted to use an EXECBHR macro.

X'0120' A dynamic save area pool was incorrectly structured.

X'0121' A SETIME macro specified an ECB address outside the buffer pool.

X'0122' A SETIME macro specified an invalid QCB address.

X'0123' Unassigned.

X'0124' Unassigned.

X'0125' Unassigned.

X'0126' Unassigned.

X'0127' Unassigned.

X'0128' Unassigned.

X'0129' A CHAP macro specified an invalid QCB address.

X'012A' Unassigned.

X'012B' Unassigned.

X'012C' Unassigned.

X'012D' A task attempted a reentrant return when no save area was currently allocated to the task.

X'012E' Unassigned.

X'012F' Unassigned.

X'0130' A POST macro specified an ECB whose status was already "event complete".

X'0131' A task attempted to change the dispatching priority of a waiting QCB to APPNDG.

Errors Detected by Queue Management (Byte 0 = X'02')

X'0201' An ENQUE macro specified an element that was already enqueued.

X'0202' An INSERT macro specified an element that was already enqueued.

X'0203' An EXTRACT macro specified the same address for the QCB and the positional element.

X'0204' Unassigned.

X'0205' An INSERT macro specified an element at the end of a queue.

- X'0206'** An INSERT macro specified the same address for the element to be inserted and the element after which it was to be inserted.
- X'0207'** An INSERT macro specified the same address for the element to be inserted and the QCB governing the queue.
- X'0208'** An ENQUE macro specified the same address for the element to be enqueued and the QCB governing the queue.
- X'0209'** A BHR attempted to use an ENQUE macro specifying an active queue control block.
- X'020A'** Unassigned.
- X'020B'** Unassigned.
- X'020C'** Unassigned.
- X'020D'** Unassigned.
- X'020E'** Unassigned.
- X'020F'** Unassigned.
- X'0210'** An ENQUE macro specified an element outside the buffer pool
- X'0211'** An INSERT macro specified an element outside the buffer pool (positional element).
- X'0212'** An INSERT macro specified an element outside the buffer pool (insertion element).
- X'0213'** An EXTRACT macro specified an element outside the buffer pool (positional element).
- X'0214'** Unassigned.
- X'0215'** An ADVAN macro specified an element outside the buffer pool (positional element).
- X'0216'** A DEQUE macro specified an invalid QCB address.
- X'0217'** An ENQUE macro specified an invalid QCB address.
- X'0218'** A POINT macro specified an invalid QCB address.
- X'0219'** An INSERT macro specified an invalid QCB address.
- X'021A'** An INSERT macro specified the active QCB.

X'021B' An ENQUE macro attempted to enqueue the active QCB.

Errors Detected by Buffer Management (Byte 0 = X'03')

X'0301' A CHAIN macro specified a buffer that was already chained.

X'0302' A CHAIN macro specified the same address for the buffer to be chained and the buffer to which it was to be chained.

X'0303' Unassigned.

X'0304' A RELEASE macro specified a BCU containing more buffers than the system limit on buffers per BCU (as computed at NCP initialization time).

X'0306' A RELEASE macro specified a BCU enqueued to a system queue.

X'0307' The BCU specified in a RELEASE macro had a task still waiting on its event control block.

X'030A' Unassigned.

X'030B' Unassigned.

X'030C' Unassigned.

X'030E' Unassigned.

X'030F' A RELEASE macro specified a buffer outside the buffer pool (buffer address low).

X'0310' A CHAIN macro specified a buffer outside the buffer pool (positional buffer address).

X'0311' A CHAIN macro specified a buffer outside the buffer pool (new buffer address).

X'0312' An UNCHAIN macro specified a buffer outside the buffer pool (positional buffer address).

X'0314' A SCAN macro specified a buffer outside the buffer pool (positional buffer address).

X'0315' A RELEASE macro specified a buffer outside the buffer pool (buffer address high).

X'0316' Initialization routines were unable to allocate buffers.

X'0317' Unassigned.

X'0318' A LEASE macro specified an ECB address outside the buffer pool.

X'0319' A LEASE macro specified a buffer count of 0.

X'0320' The buffer pool size and the buffer availability count were in conflict.

Errors Detected by Supervisory Services (Byte 0 = X'04')

X'0401' A GETBYTE macro specified a BCU address outside the buffer pool.

X'0402' Unassigned.

X'0403' A PUTBYTE macro specified a BCU address outside the buffer pool.
(address high).

X'0404' Unassigned.

X'0405' A GETBYTE macro specified a BCU with an incorrect text length.

X'0406' A PUTBYTE macro specified a BCU with an incorrect text offset (in one or more of the buffer prefix fields), or a PUTBYTE macro with the operand UPDATE = YES specified a BCU with an incorrect text length.

X'0407' A GETIME macro specified invalid options.

Hardware Related Errors (Byte 0 = X'05')

X'0501' The retry limit for unresolved level 1 interrupts was exceeded.

X'0502' The retry limit for unresolved level 3 channel adapter interrupts was exceeded.

X'0503' A nonrecoverable channel adapter check occurred.

X'0504' A nonrecoverable communication scanner check occurred.

X'0505' A type 2 channel adapter cycle steal protection exception occurred.

X'0506' A type 2 channel adapter cycle steal addressing exception occurred.

X'0507' The retry limit for recoverable channel adapter checks was exceeded.

X'0508' The retry limit for recoverable communication scanner checks was exceeded.

X'050A' A channel adapter check could not be resolved.

X'050B' A communication scanner check could not be resolved.

X'050C' A program level 1 interrupt could not be resolved.

X'050D' A machine check or IPL request was not serviced by hardware.

- X'050E'** A program level 3 interrupt could not be resolved.
- X'050F'** A program level 4 timer interrupt request expired and the timer interval was not scheduled.
- X'0510'** NCP generation conflict—the NCP was not configured for the type of communication scanner installed.
- X'0521'** NCP generation conflict—program level 1 was not configured for the type of channel adapter installed.
- X'0522'** NCP generation conflict—an interrupt occurred from an inactive or undefined channel adapter. The channel adapter, if installed, should have been switched off line by the operator at the 3705 and should have remained disabled.

Errors Detected in Level 5 (Byte 0 = X'10')

- X'1001'** A BCU with a Restart command contained an error in the text length field.
- X'1002'** The line control block (LCB) contained an invalid resource ID.
- X'1003'** The subtask sequence pointer in the LCB was not initialized.
- X'1004'** The BTU contained an invalid command modifier.
- X'1005'** After BHR execution, the device input queue was empty (point 1).
- X'1006'** After BHR execution, the line I/O queue was empty (point 2).
- X'1007'** After BHR execution, the point 3 BHR queue was empty.
- X'1008'** A task associated with the point 3 BHR queue was dispatched.
- X'1009'** The backspace BHR was dispatched, but the queue was empty.
- X'100A'** A data manipulation error occurred in the backspace BHR.
- X'100B'** The date/time BHR was dispatched, but the queue was empty.
- X'100C'** All 'skip' flags were set in the service order table (SOT).
- X'100D'** The number of dial digits passed from the host was not equal to the BTU text length.
- X'100E'** No Reset command was found at the end of an operation that was being reset.
- X'100F'** The device base (DVB) contained an invalid resource ID.
- X'1010'** An invalid system resource ID was specified in the BCU.
- X'1011'** An invalid checkpoint data length was specified in the BCU.
- X'1012'** The BH set pointer (DVIBHSET) in the DVB did not match any entry in the system BH set table (BST).

| Name | Instruction | C, Z | 3704 Cycles | 3705 Cycles | FORMAT | | | | | | | | | | | | | | | | |
|------|-------------------------------------|------|----------------|----------------|--------|----------------|----------------|---|----------------|----------------|---|---|---|---|----|-----|----|----|----|----|--|
| | | | | | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | |
| B | Branch | | 2 | 1 | 1 | 0 | 1 | 0 | 1 | | | | | | | | | | | | |
| BCL | Branch on C Latch | | 2 | 1 | 1 | 0 | 0 | 1 | 1 | T | | | | | | | | | | ± | |
| BZL | Branch on Z Latch | | 2 | 1 | 1 | 0 | 0 | 0 | 1 | | | | | | | | | | | ± | |
| BCT | Branch on Count | | 3 | 1 | 1 | 0 | 1 | 1 | 1 | | | 1 | T | | | | ± | | | | |
| BB | Branch on Bit | | 3 | 1 | 1 | 1 | M | M | 1 | | | M | | | | | ± | | | | |
| LRI | Load Register Immediate | * | 3 | 1 | 1 | 0 | 0 | 0 | 0 | | | | | | | | | | | | |
| ARI | Add Register Immediate | * | 3 | 1 | 1 | 0 | 0 | 1 | 0 | | | | | | | | | | | | |
| SRI | Subtract Register Immediate | * | 3 | 1 | 1 | 0 | 1 | 0 | 0 | | | | | | | | | | | | |
| CRI | Compare Register Immediate | * | 3 | 1 | 1 | 0 | 1 | 1 | 0 | R | N | | I | | | | | | | | |
| XRI | Exclusive Or Register Immediate | * | 3 | 1 | 1 | 1 | 0 | 0 | 0 | | | | | | | | | | | | |
| ORI | Or Register Immediate | * | 3 | 1 | 1 | 1 | 0 | 1 | 0 | | | | | | | | | | | | |
| NRI | And Register Immediate | * | 3 | 1 | 1 | 1 | 1 | 0 | 0 | | | | | | | | | | | | |
| TRM | Test Register under Mask | * | 3 | 1 | 1 | 1 | 1 | 1 | 0 | | | | | | | | | | | | |
| LCR | Load Character Register | * | 3 | 1 | 0 | | | 0 | | | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | | | |
| ACR | Add Character Register | * | 3 | 1 | 0 | | | 0 | | | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | | | |
| SCR | Subtract Character Register | * | 3 | 1 | 0 | | | 0 | | | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | | | |
| CCR | Compare Character Register | * | 3 | 1 | 0 | R ₂ | N ₂ | 0 | R ₁ | N ₁ | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | | | |
| XCR | Exclusive Or Character Register | * | 3 | 1 | 0 | | | 0 | | | 0 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | | | |
| OCR | OR Character Register | * | 3 | 1 | 0 | | | 0 | | | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | | | |
| NCR | And Character Register | * | 3 | 1 | 0 | | | 0 | | | 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | | | |
| LCOR | Load Character with Offset Register | * | 3 | 1 | 0 | | | 0 | | | 0 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | | | |
| ICT | Insert Character and Count | | 5 | 2 | 0 | | | 0 | | | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | | | |
| STCT | Store Character and Count | | 5 | 2 | 0 | | | 0 | R | N | | 0 | 0 | 1 | 1 | 0 | 0 | 0 | | | |
| IC | Insert Character | * | 4 | 2 | 0 | | | 1 | | | 0 | D | | | | | | | | | |
| STC | Store Character | | 4 | 2 | 0 | B | 1 | 1 | | | 1 | | | | | | | | | | |
| LH | Load Halfword | * | 4 | 2 | 0 | | | 0 | | | 0 | D | | | | 1 | | | | | |
| STH | Store Halfword | | 4 | 2 | 0 | | | 0 | R | | | 1 | | | | | 1 | | | | |
| L | Load | * | 5 | 2 [#] | 0 | | | 0 | | | 0 | D | | | | 1 0 | | | | | |
| ST | Store | | 5 | 2 [#] | 0 | | | 0 | | | 1 | | | | | 1 0 | | | | | |
| LHR | Load Halfword Register | * | 3 | 1 | 0 | | | 0 | | | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| AHR | Add Halfword Register | * | 3 | 1 | 0 | | | 0 | | | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | | | |
| SHR | Subtract Halfword Register | * | 3 | 1 | 0 | | | 0 | | | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | | | |
| CHR | Compare Halfword Register | * | 3 | 1 | 0 | | | 0 | | | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | | | |
| XHR | Exclusive Or Halfword Register | * | 3 | 1 | 0 | | | 0 | | | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| OHR | OR Halfword Register | * | 3 | 1 | 0 | | | 0 | | | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | | | |
| NHR | And Halfword Register | * | 3 | 1 | 0 | R ₂ | | 0 | R ₁ | | | 1 | 1 | 1 | 0 | 0 | 0 | 0 | | | |
| LHOR | Load Halfword with Offset Register | * | 3 | 1 | 0 | | | 0 | | | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | | | |
| LR | Load Register | * | 3 | 1 | 0 | | | 0 | | | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | | | |
| AR | Add Register | * | 3 | 1 | 0 | | | 0 | | | 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | | | |
| SR | Subtract Register | * | 3 | 1 | 0 | | | 0 | | | 1 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | | | |
| CR | Compare Register | * | 3 | 1 | 0 | | | 0 | | | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | | | |
| XR | Exclusive Or Register | * | 3 | 1 | 0 | | | 0 | | | 1 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | | | |
| OR | OR Register | * | 3 | 1 | 0 | | | 0 | | | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | | | |
| NR | And Register | | 3 | 1 | 0 | | | 0 | | | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | | | |
| LOR | Load with Offset Register | * | 3 | 1 | 0 | | | 0 | | | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | | | |
| BALR | Branch & Link Register | | 4 | 2 | 0 | | | 0 | | | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | | | |
| IN | Input | | 2 | 1 | 0 | E | | 0 | R | E | | | | | | 1 | 1 | 0 | 0 | | |
| OUT | Output | | 2 | 1 | 0 | | | 0 | | | | | | | | | 0 | 1 | 0 | 0 | |
| BAL | Branch & Link | | 3 | 2 | 1 | 0 | 1 | 1 | 1 | | | 0 | 0 | 0 | 0 | 0 | 16 | | | | |
| LA | Load Address | | 3 | 2 | 1 | 0 | 1 | 1 | 1 | | | 0 | 0 | 1 | 0 | 0 | A | | | | |
| EXIT | Exit | | 2 | 1 | 1 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | | | | | |

* = Instructions that can alter condition latches.

± 1 = -

0 = +

= 3 Cycles with Extended Addressing